

CHAPTER 6

OEAS OXYGEN CONCENTRATOR TYPE GGU-12/A, P/N 3261077-0101

**EFFECTIVITY: THIS CHAPTER IS TO BE USED ONLY WHEN
USING MODIFIED TEST SET, TTU-518A/E**

Section 6-1. Description

6-1. GENERAL.

6-2. The Oxygen Enriched Air System (OEAS) GGU-12/A Oxygen Concentrator, Type GGU-12/A, P/N 3261077-0101 (figure 6-1), is manufactured by Litton Life Support, formerly Clifton Precision (CAGE 99251). The concentrator is designed to provide a supply of breathing oxygen for two aircrewmembers' open loop breathing schedule up to 50,000 feet. Table 6-1 contains the leading particulars for the GGU-12/A oxygen concentrator.

6-3. CONFIGURATION.

6-4. The GGU-12/A oxygen concentrator consists of an air heater assembly, inlet filter assembly, pressure reducer assembly, rotary valve assembly, two molecular sieve beds, a plenum assembly, a thermal resistor, a junction box assembly, a thermostatic switch, and a shroud.

6-5. FUNCTION.

6-6. The GGU-12/A oxygen concentrator uses engine bleed air and electrical power from the aircraft and provides oxygen-enriched air for aircrewmember breathing. The compressed air enters the concentrator through an air heater (1) (figure 6-2) and then passes through an inlet filter (2). The supply air pressure is reduced through the pressure reducer assembly (3) to conserve air when inlet pressure is greater than required. The supply air is then routed to the motor-driven rotary valve (4) which sequentially ports the air to the molecu-

lar sieve beds (5). The two sieve beds operate as an alternating pair due to the design of the rotary valve. When one bed is pressurized, and producing oxygen while adsorbing nitrogen, the other is venting to ambient and desorbing nitrogen from the prior pressurization cycle.

6-7. The regeneration by desorption of nitrogen in the vented bed is enhanced by a reverse flow of oxygen-enriched gas from the output or product end of the pressurized bed. The amount of the reverse purge flow through the vented bed is controlled by the purge orifice connecting the output ends of the two beds. The two beds are cycled alternately between pressurization or oxygen producing mode and the vented, regenerative mode by the motor driven rotary valve. The output oxygen-enriched product gas from the pressurized bed flows into the plenum assembly (6) and through check valves at the outlet of each sieve bed preventing backflow.

6-8. The oxygen-enriched product gas from the concentrator flows through a filter and then to the aircrew breathing system.

6-9. A thermal resistor (7) senses inlet air temperature and controls heater operation, while a thermostatic switch (8) turns off the inlet air heater when the heater case temperature exceeds the overtemperature limit. A manual reset overtemperature indicator displays an overtemperature condition.

6-10. Electronic components for control of the inlet air heater and the rotary valve motor are contained within the junction box assembly (9).

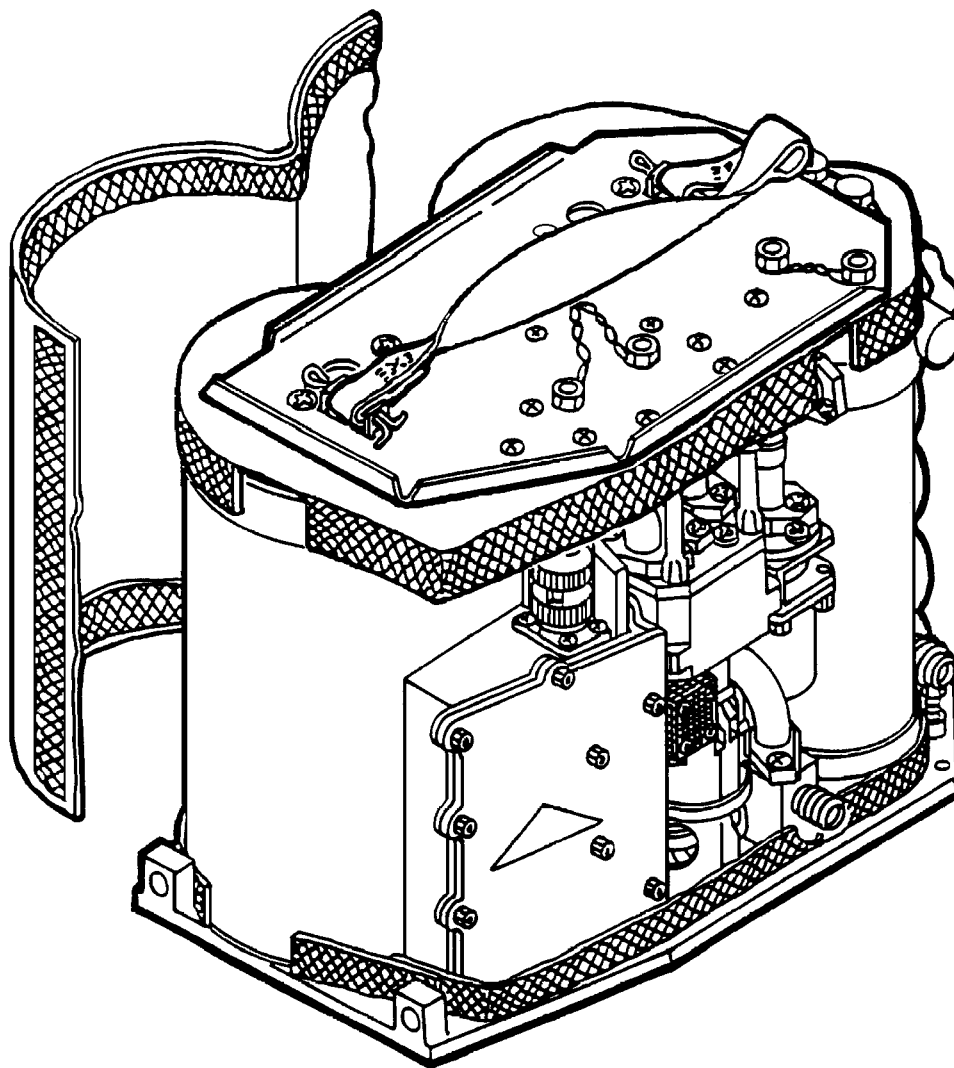
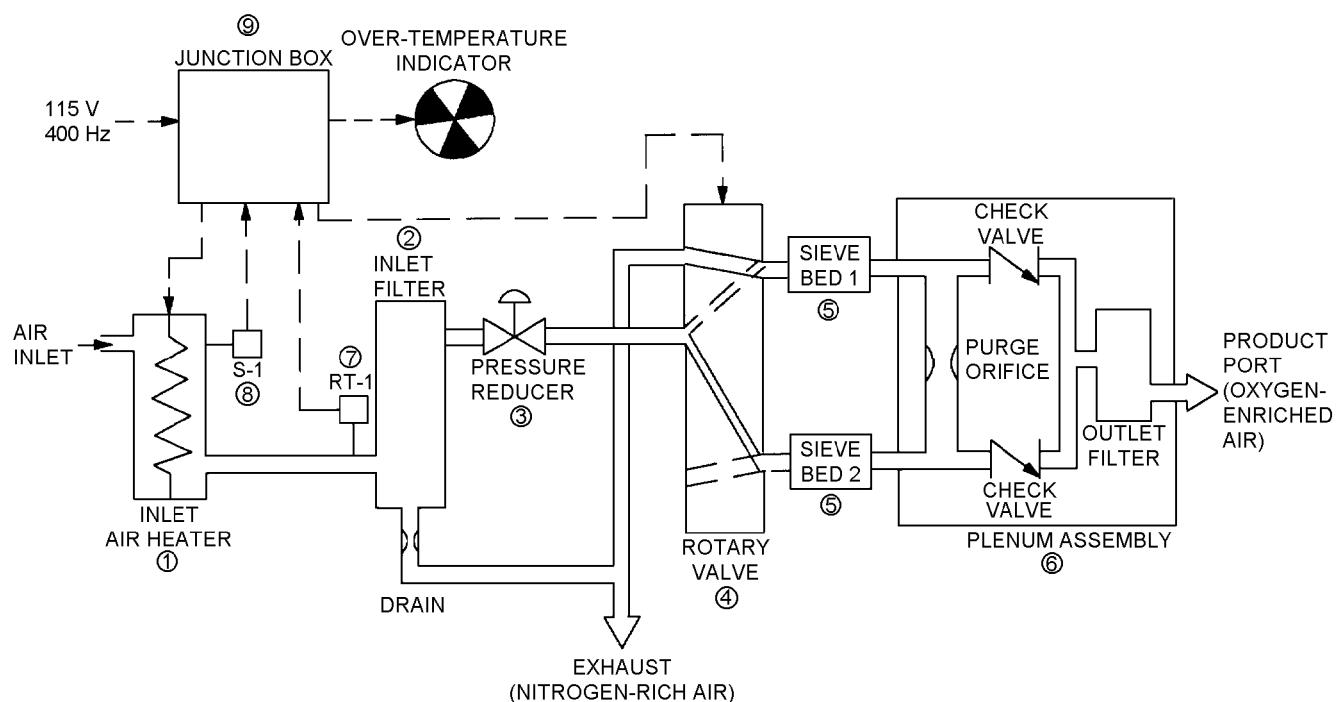


Figure 6-1. GGU-12/A Oxygen Concentrator, P/N 3261077-0101 (shown with shroud removed) 006001

Table 6-1. Leading Particulars

Type GGU-12/A	P/N 3261077-0101
Mounting	2 index pins, 2 captive fasteners used for aircraft mounting
Voltage	115 Vac, 400 Hz, 6 amps (max)
Heater	1 unit with air heater overtemperature indicator
Filter	0.6 Micron
Inlet Pressure Range	8 to 250 psig, 50 psig preferred
Pressure Reducer	Cut in at 50 psig inlet pressure and increases to 85 ± 5 psig at 250 psig inlet pressure
Relief Valve	125 psig outlet pressure
Rotary Valve	6.35 RPM (continuous rotation)
Sieve Beds	Two unit, molecular type
Plenum	Oxygen enriched air storage
Junction Box	Power supply for heater and rotary valve
Operating Altitude Range	Sea level to 50,000 feet
Operating Temperature	-65° to +165°F
Overall Dimensions:	
Length:	13 3/4 inches
Width	8 2/3 inches
Height	10 1/3 inches
Weight	37.5 lbs.

**Figure 6-2. GGU-12/A Oxygen Concentrator Schematic**

006002

Section 6-2. Modifications

6-11. GENERAL.

6-12. There are no modifications to the GGU-12/A concentrator required/authorized at this time.

Section 6-3. Performance Test Sheet Preparation

6-13. GENERAL.

6-14. A Performance Test Sheet shall be prepared as shown in [figure 6-4](#) or [figure 6-5](#) (with OBOGS adapter) and shall be used to record test results. The Performance Test Sheets shown are samples, but may be reproduced for local use.

Section 6-4. Maintenance

6-15. GENERAL.

6-16. This section contains the procedural steps for inspection and testing of the GGU-12/A oxygen concentrator.

6-17. Procedural steps outlined in this section are listed under the inspection cycle in which they are required and in the sequence in which they normally occur.

NOTE

Upon completion of any maintenance action (inspection or testing) be sure to complete the necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

6-18. Prior to testing or maintenance of GGU-12/A oxygen concentrator, it is necessary to determine whether or not the unit has the -2 configuration of the inlet filter assembly. The -2 configuration of this assembly provides improved moisture and fluid drainage at the inlet filter, preventing possible oxygen degradation and elimination of corrosion effects. This effects units without a serial number prefix of RHZ or SEU or units with a

serial number prefix of RHZ 339 or below. To determine whether or not the inlet filter assembly on these units has been modified, inspect for the following:

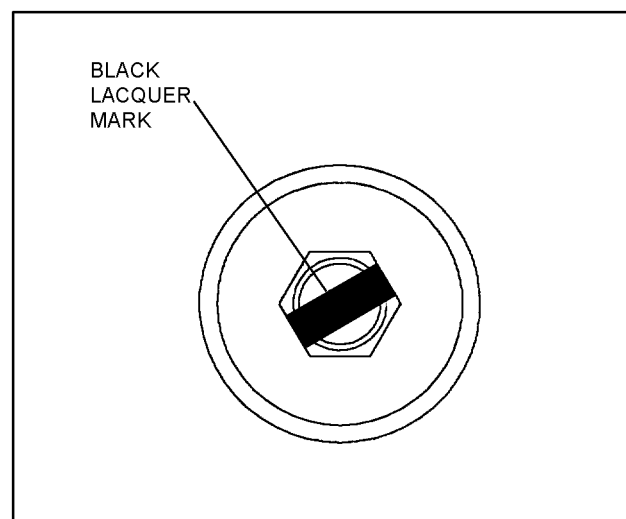


Figure 6-3. Black Lacquer Marking on Special Bolt

006003

a. Inlet filter assembly (14, [figure 6-11](#)) is marked with P/N 1647710-1. After it has been modified, the P/N becomes 1647710-2.

b. Filter post special screw is not marked with black lacquer. After it has been modified, it will be marked as shown in [figure 6-3](#).

NOTE

If you have determined that modification is required, perform the procedure in conjunction with the Replacement of Inlet Filter Tube Element, [paragraph 6-89](#).

6-19. INSPECTIONS.

6-20. GGU-12/A oxygen concentrators which do not pass inspection and cannot be adjusted in the aircraft shall be removed and replaced with a Ready-For-Installation (RFI) GGU-12/A oxygen concentrator. The replaced oxygen concentrator shall be forwarded to AIMD/MALS for Bench Test and Repair.

6-21. TURNAROUND/PREFLIGHT/POSTFLIGHT/TRANSFER INSPECTIONS. The Turnaround/Pre-flight/Postflight/Transfer Inspections are performed in conjunction with the aircraft inspection requirements for the aircraft in which the GGU-12/A oxygen concentrator is installed.

6-22. ACCEPTANCE/SPECIAL/DAILY INSPECTIONS. The Acceptance/Special/Daily Inspections shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the GGU-12/A oxygen concentrator is installed using applicable aircraft technical publications and maintenance requirement cards.

6-23. CALENDAR/PHASED/SDLM INSPECTIONS.

The Calendar/Phased/SDLM Inspections require removal of the GGU-12/A oxygen concentrator from the aircraft. See applicable planned maintenance system (PMS) publications for specified intervals. In no case shall the interval exceed 400 flight hours. Upon removal from the aircraft, the concentrator shall be forwarded to AIMD/MALS for Inspection and Bench Test.

6-24. VISUAL INSPECTION. To perform a Visual Inspection of the GGU-12/A oxygen concentrator, proceed as follows:

1. Inspect the GGU-12/A oxygen concentrator over-temperature indicator for fault indication. Record on the Performance Test Sheet. If fault was indicated, reset overtemperature indicator after recording fault on data sheet.

2. Inspect the GGU-12/A oxygen concentrator for dents, corrosion, dirt, contamination, and other obvious damage. Correct as necessary.

3. Inspect electrical connections and wiring for good connection, breaks in wires, corrosion, and bent or missing pins. Correct as necessary.

4. Inspect all welded points for security of attachment and breaks in welding. Correct as necessary.

5. Inspect shroud assembly for cuts, tears, and hole punctures (except at exit locations and interface ports). Correct as necessary.

6. Inspect all external screws, nuts, and fittings for good condition. Correct as necessary.

7. Inspect nameplate for legibility, security of attachment, and good condition. Correct as necessary.

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GGU-12/A CONCENTRATOR PERFORMANCE TEST SHEET

P/N 3261077-0101

DATE _____ CONCENTRATOR SERIAL NO. _____

TEST STAND SERIAL NO. _____ TEST STAND OPERATOR _____

CDI _____

1. CHECK OVERTEMPERATURE INDICATOR ON CONCENTRATOR:
NO FAULT INDICATED _____ (✓) FAULT INDICATED/RESET _____ (✓)

2. 115V MOTOR HEATER CURRENT TEST - CONC ON SWITCH (S1) IS ON:
CHECK IF 115V HEATER LAMP (DS6) ILLUMINATES AND THEN EXTINGUISHES _____ (✓)

■ RECORD 115V NO LOAD MOTOR METER (M2) READING _____ (.4 AMPS MAXIMUM).

RECORD 115V MOTOR METER (M2) READING _____

■ RECORD FINAL 115V MOTOR METER (M2) READING _____ (.45 AMPS MAXIMUM).

3. 115V MOTOR VALVE RPM TEST
NUMBER OF PRESSURE DROPS DURING TWO MINUTE PERIOD _____ (23 TO 27 DROPS)

4. PRESSURE REDUCER TEST
READ AIR-OXY PRESSURE GAGE (G1) _____ (47.5 TO 54 PSIG)

5. INTERNAL LEAKAGE TEST
INITIAL READING AIR-OXY PRESSURE GAGE (G1) _____

G1 READING AFTER 1 MINUTE _____ (3 PSIG MAX. DECREASE)

G1 READING AFTER 5 MINUTES _____ (15 PSIG MAX. DECREASE)

6. OXYGEN FLOW TEST/FILTER DRAIN FLOW TEST
FILTER DRAIN FLOW TEST: YES _____ (✓)

SET AIR-OXY PRESSURE GAGE (G1) TO 15 PSIG

V2 SETTING	G3 ALLOWED (PSIG)	G3 READING	G1 ALLOWED (PSIG)	G1 READING	M3 ALLOWED (%)	M3 READING
HIGH	85 TO 120		4 TO 15		25	
MEDIUM	85 TO 120		4.5 TO 15		35	
LOW	85 TO 120		5 TO 15		56	

SET AIR-OXY PRESSURE GAGE (G1) TO 50 PSIG

V2 SETTING	G3 ALLOWED (PSIG)	G3 READING	G1 ALLOWED (PSIG)	G1 READING	M3 ALLOWED (%)	M3 READING
HIGH	85 TO 120		13 TO 50		58.5	
MEDIUM	85 TO 120		14 TO 50		79.5	
LOW	85 TO 120		18 TO 50		93	

Figure 6-4. Performance Test Sheet

GGU-12/A CONCENTRATOR (P/N 3261077-0101)
PERFORMANCE TEST SHEET UTILIZING OBOGS ADAPTER
ASSEMBLY (P/N 3248AS100-1)

DATE _____ CONCENTRATOR SERIAL NO. _____

TEST STAND SERIAL NO. _____ TEST STAND OPERATOR _____

CDI _____

1. CHECK OVERTEMPERATURE INDICATOR ON CONCENTRATOR:
NO FAULT INDICATED _____ (✓) FAULT INDICATED/RESET _____ (✓)
2. 115V MOTOR HEATER CURRENT TEST - CONC ON SWITCH (S1) IS ON:
CHECK IF 115V HEATER LAMP (DS6) ILLUMINATES AND THEN EXTINGUISHES _____ (✓)
RECORD 115V MOTOR METER (M2) READING _____ (.45 AMPS MAXIMUM)
3. 115V MOTOR VALVE RPM TEST
NUMBER OF PRESSURE DROPS DURING TWO MINUTE PERIOD _____ (23 TO 27 DROPS)
4. PRESSURE REDUCER TEST
READ AIR-OXY PRESSURE GAGE (G1) _____ (47.5 TO 54 PSIG)
5. INTERNAL LEAKAGE TEST
INITIAL READING AIR-OXY PRESSURE GAGE (G1) _____
G1 READING AFTER 1 MINUTE _____ (3 PSIG MAX. DECREASE)
G1 READING AFTER 5 MINUTES _____ (15 PSIG MAX. DECREASE)
6. OXYGEN FLOW TEST/FILTER DRAIN FLOW TEST
FILTER DRAIN FLOW TEST: YES _____ (✓)

SET AIR-OXY PRESSURE GAGE (G1) TO 15 PSIG

V2 SETTING	G3 ALLOWED (PSIG)	G3 READING	G1 ALLOWED (PSIG)	G1 READING	M3 ALLOWED (%)	M3 READING
HIGH	75 TO 120		4 TO 15		25	
MEDIUM	75 TO 120		4.5 TO 15		35	
LOW	75 TO 120		5 TO 15		56	

SET AIR-OXY PRESSURE GAGE (G1) TO 50 PSIG

V2 SETTING	G3 ALLOWED (PSIG)	G3 READING	G1 ALLOWED (PSIG)	G1 READING	M3 ALLOWED (%)	M3 READING
HIGH	75 TO 120		13 TO 50		58.5	
MEDIUM	75 TO 120		14 TO 50		79.5	
LOW	75 TO 120		18 TO 50		93	

Figure 6-5. Performance Test Sheet (With OBOGS Adapter)

6-25. BENCH TEST.

WARNING

When working with oxygen, make certain that clothing, tubing, fittings, and equipment are free of oil, grease, fuel, hydraulic fluid, or any combustible liquid. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

CAUTION

Check the overtemperature indicator on the GGU-12/A concentrator. If a fault is indicated, record fault (paragraph 6-24, step 1) and reset overtemperature indicator. When GGU-12/A concentrator is attached to the P/N 1779AS500-2 test set, take note of the 115 V HEATER lamp (DS6) when CONC ON switch (S1) is turned ON. If DS6 illuminates and does not extinguish within 30 seconds, this indicates overheating of the concentrator and further testing could result in damage to the unit.

NOTE

When performing Bench Test, use the Performance Test Sheet (figure 6-4 or figure 6-5) for recording readings and indications as they apply. Read the entire step before beginning to familiarize yourself with what needs to be recorded for that step.

Tests are arranged so they proceed from one test to the next with a minimum of change of connections and valve positioning.

GGU-12/A oxygen concentrators failing the bench test shall be repaired. The aviation life support systems division shall replace all defective component parts and make necessary adjustments to the oxygen concentrator.

6-26. Bench Test shall be performed on the GGU-12/A oxygen concentrator prior to being placed in service and every 400 flight hours when inlet filter tube element is replaced. The inlet filter tube element shall be replaced every time the oxygen concentrator is serviced prior to any testing or repair. The oxygen concentrator shall also be subjected to Bench Test if malfunction is suspected, and after repair or replacement of malfunctioning or damaged parts.

6-27. The Bench Test shall be performed using the Oxygen Concentrator Test Set, Model TTU-518A/E (P/N 1779AS500-2) only (paragraph 6-31) or the Test Set utilizing that OBOGS adapter (paragraph 6-39). Refer to appropriate ground support equipment manual for identification of test set controls and indicators referred to in Bench Test.

6-28. Due to complexity of the model TTU-518A/E test set, it is essential the operator become thoroughly familiar with test set prior to performing the Bench Test. Refer to appropriate ground support equipment manual.

6-29. Unless otherwise specified in a specific test, the pressure applied and valve positioning shall remain unchanged.

6-30. TEST SET MONITOR TEST. In order to prevent unnecessary replacement of concentrator sieve beds, the Test Set Monitor Test is performed only if the concentrator fails the Oxygen Flow Test/Filter Drain Flow Test (paragraph 6-37 or paragraph 6-44). To perform the Test Set Monitor Test, refer to the appropriate support equipment technical manual.

6-31. BENCH TEST USING TEST SET TTU-512A/E ONLY.

6-32. Test Set Setup and Display Lamp Test. To set up the test set and check out its display lamps, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—
As Required	Tubing, Plastic	CHEMFLUORAX-H00002

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly, Outlet	1779AS522-1
1	Adapter Assembly, Exhaust	1779AS524-1
1	Cable Assembly, Concentrator	1779AS516-1
1	Cable Assembly, Power Supply	1779AS180-1

Support Equipment Required (Cont)

Quantity	Description	Reference Number
1	Cable Assembly, Power Supply	1779AS517-1
1	Concentrator Test Set, Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Hose Assembly, Inlet	1779AS133-1
1	Hose Assembly, Outlet	1779AS134-1
1	Hose Assembly, Oxygen	5SE01859-1
1	Muffler Assembly	1779AS578-1
1	Tube Pliers, Inlet Filter Drain	3309311-1 (CAGE 99251)

WARNING

To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings tools, and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc.) and any other combustible materials. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

CAUTION

Do not lift or carry the GGU-12/A oxygen concentrator by the exhaust vent metallic tube assembly or the rotary valve assembly. Damage to the GGU-12/A oxygen concentrator will occur.

1. Ensure test set lid is removed and circuit breaker INSTM ON (CB3) is in the RESET position (pushed in).

2. Ensure circuit breakers 28 VDC ON (CB1), 115 VAC ON (CB2) and switch CONC ON (S1) are OFF.

3. Turn PRESSURE SELECT valve (V1) to the AIR TO CONC position.

4. Turn FLOW SELECT valve (V2) to LOW position.

NOTE

OXY ANALYZER (V3) and CONC FLOW (V4) are toggle valves. They are closed when the black handle is parallel to the panel assembly. They are open when the black handle is perpendicular to the panel assembly.

5. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are in the CLOSED position.

6. Ensure adjusting knob of AIR PRESSURE CONTROL (RG1) is turned counterclockwise four turns or until spring tension is released.

7. Ensure adjusting knob of FLOW PRESSURE CONTROL (RG2) is turned counterclockwise four turns or until spring tension is released.

8. Ensure test set panel vent next to FLOW PRESSURE gage (G2) is clean and free of any foreign material.

9. Remove all hoses, cables, adapters, muffler, and filter from lid of concentrator test set.

10. Remove protective shipping covers from the GGU-12/A concentrator cable assembly.

11. Remove cap assembly from 115 V CONC POWER (J13) on test set.

12. Connect one end of GGU-12/A concentrator cable assembly to 115 V CONC POWER (J13) and the other end to concentrator.

13. Remove cap assemblies from AIR TO CONC (J4) and OXY FROM CONC (J3).

14. Remove protective shipping caps and connect one end of concentrator outlet hose assembly to the GGU-12/A concentrator outlet adapter assembly. Connect this assembly to OXY FROM CONC (J3). Connect other end of concentrator outlet hose to oxygen concentrator outlet port.

15. Remove protective shipping plugs and connect one end of concentrator inlet hose assembly to AIR TO CONC (J4). Connect other end of concentrator inlet hose to the GGU-12/A oxygen concentrator inlet port.

CAUTION

Do not restrict exhaust flow from concentrator by any other means than muffler assembly.

16. Remove protective shipping cover from muffler assembly.

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17. Connect the muffler assembly to GGU-12/A exhaust adapter assembly. Remove protective shipping cap and connect this assembly to GGU-12/A oxygen concentrator exhaust port.

18. Remove protective shipping cap from the OXY EXHAUST (J5) on concentrator test set.

19. Remove protective shipping caps (P/N 1779AS518-1) from inlet filter assembly.

20. Remove cap assembly from FILTER PORT (J1) and connect inlet filter assembly to FILTER PORT (J1).

21. Connect inlet filter assembly to a source of clean, dry air that is regulated to 90 to 120 psig and is capable of supplying 26 SCFM, using oxygen hose assembly with reducer. Turn on shop air supply. Pressure is indicated on INLET PRESSURE (G3) on test set. At no time during operation shall G3 fall below 85 psig.

22. Remove cap assemblies from 28 Vdc connector (J10) and 115 Vac connector (J12).



Do not connect 28 Vdc return and case ground together. Allow 28 Vdc to float.

23. Connect 28 V power cable assembly (P/N 1779AS180-1) to 28 Vdc connector (J10) and a 28 Vdc power supply. The connector on power supply end of cable is an MS3106A16-11P. Pin B is +28 Vdc (positive) and Pin A is return (negative). The connector shell is case ground.

24. Turn on power supply.



Hazardous voltages may be present on case of the test set if power plug and source are not connected to safety ground (green wire).

25. Connect 115 V power cable assembly (P/N 1779AS517-1) from 115 Vac connector (J12) to a locally available mating power plug (rated at 6 amps) and connect to a 115 Vac 400 Hz, 6 amp minimum power source. The black wire is high, white is low and green is safety ground.

NOTE

% OXYGEN Meter (M3) will initially read 0.5% and should stabilize at approximately $21 \pm 2\%$ within 5 minutes.

26. Set 28 VDC ON circuit breaker (CB1) to ON. DS1 lamp and M3 meter will illuminate. RG4 HEATER lamp (DS3) will illuminate momentarily and then extinguish to indicate the monitor is operating within temperature limits.

27. Set 115 VAC ON circuit breaker (CB2) to ON. DS2 lamp will illuminate.

28. Push and release PUSH TO TEST DISPLAY button (S2). RG4 Heater lamp (DS3), 28 V HEATER NO. 1 lamp (DS4), 28 V HEATER NO. 2 lamp (DS5), and 115 V HEATER lamp (DS6) shall illuminate and extinguish when S2 is released.

29. Leave all connections and valves unchanged and proceed to next test.

6-33. 115 V Motor Heater Current Test. To perform the 115 V Motor Heater Current Test, proceed as follows:



CONC ON switch (S1) power and RG1 pressure should be applied as close together as possible. Damage to the concentrator may occur if RG1 pressure is applied to concentrator prior to energizing rotary valve motor. The rotary valve motor should not be energized for extended periods without air pressure applied to concentrator.

NOTE

Ensure motor meters M1 and M2 are indicating zero; if the test set was calibrated in the vertical position and your test is in the horizontal position, chances are M1 and M2 are not indicating zero. The test set must be positioned as it was calibrated.

1. Disconnect GGU-12/A Concentrator Cable Assembly from 115V CONC POWER (J13) of test set.

2. Turn CONC ON SWITCH (S1) to ON and record 115V NO LOAD reading from motor meter (M2) on Performance Test Sheet.

3. Turn CONC ON SWITCH (S1) to OFF and reconnect GGU-12/A Concentrator Cable Assembly to 115V CONC POWER (J13) of test set.

4. Set CONC ON SWITCH to ON and adjust air pressure control (RG1) until air-oxy pressure gage (G1) reads 50 psig. 115V HEATER LAMP (DS6) will illuminate and then extinguish. Ensure audible operation of concentrator rotary valve.

5. Observe 115V MOTOR METER (M2) and record reading on Performance Test Sheet.

6. Subtract 115V NO LOAD MOTOR METER (M2) reading from step 5 above and record the remainder on Performance Test Sheet as FINAL 115V MOTOR METER (M2) reading. FINAL 115V MOTOR METER (M2) reading shall not exceed 0.45 amps maximum.

7. Leave all connections and valves unchanged and proceed to next test.

6-34. 115 V Motor Valve RPM Test. To perform the Motor Valve RPM Test, proceed as follows:

NOTE

When performing steps 1 and 2, the motor valve rotates at 6.35 RPM. There are two sudden rapid drops in pressure displayed on AIR-OXY PRESSURE gage (G1), followed by a return to normal pressure per revolution. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to concentrator exhaust port.

1. Count the number of pressure drops that occur during a two-minute period. The number of pressure drops shall be 23 to 27. Record number of pressure drops on Performance Test Sheet.

2. Leave all connections and valves unchanged and proceed to next test.

6-35. Pressure Reducer Test. To perform the Pressure Reducer Test, proceed as follows:

1. Turn CONC FLOW valve (V4) to OPEN.

2. Slowly adjust FLOW PRESSURE CONTROL valve (RG2) until FLOW PRESSURE gage (G2) indicates 30 inH₂O on the high pressure swing.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until AIR-OXY PRESSURE gage (G1) indicates 70 psig on the high pressure swing.

4. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position. AIR-OXY PRESSURE gage (G1) should indicate 47.5 to 54 psig during high pressure swing. Record reading from AIR-OXY PRESSURE gage (G1) on Performance Test Sheet.

5. If reading is within tolerance, leave all connections and valves unchanged and proceed to next test.

6-36. Internal Leakage Test. To perform the Internal Leakage Test, proceed as follows:

1. Turn CONC FLOW valve (V4) to CLOSED.

2. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until 5 psig is indicated on AIR-OXY PRESSURE gage (G1) at the high pressure swing.

4. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position.

5. Record initial reading from AIR-OXY PRESSURE gage (G1) and then wait for one minute; pressure drop shall not exceed 3 psig. Record 1-minute reading on Performance Test Sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop after 5 minutes shall not exceed 15 psig. Record 5-minute reading on Performance Test Sheet.

6. Set CONC FLOW valve (V4) to OPEN position.

7. If final reading for Internal Leakage Test is within tolerance, leave all connections and valves unchanged and proceed to the next test.

6-37. Oxygen Flow Test/Filter Drain Flow Test. To perform the Oxygen Flow Test/Filter Drain Test, proceed as follows:

CAUTION

Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

When taking reading from AIR-OXY PRESSURE gage (G1), there will be a pressure swing; record both the low and high pressure indications on the Performance Test Sheet.

While performing the Oxygen Flow Test, ensure that while concentrator is operating (CONC ON switch (S1) to ON) that the reading on INLET PRESSURE gage (G3) does not fall below 85 psig. If pressure reading does fall below 85 psig, air supply or filter assembly is inadequate and does not meet specified requirements.

1. Using Inlet Filter Drain Tube Pliers, remove filter drain hose (1, Figure 5-6) from outlet adapter (2).

2. Verify air is bleeding through drain hose (1).

3. Verify air is not leaking from filter inlet assembly.

4. Using Inlet Filter Drain Tube Pliers, install filter drain hose onto outlet adapter.

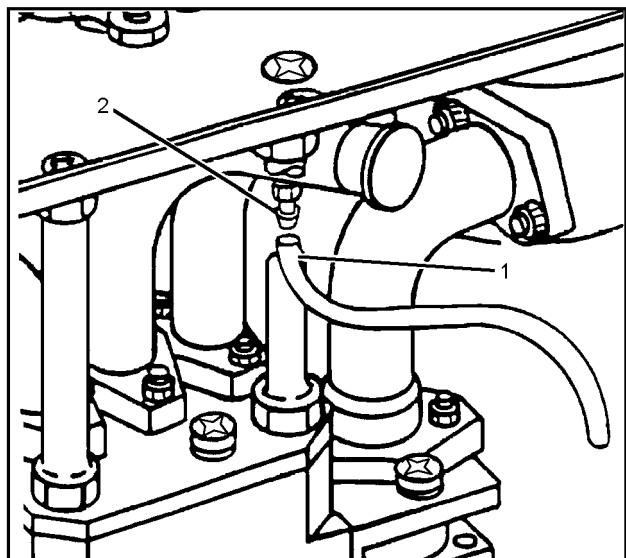


Figure 6-6. Filter Drain Hose

NOTE

If filter drain hose requires replacement when performing step 5, use plastic tubing, available from:

Read Plastics
12331 Wilkins Ave.
Rockville, MD 20852
Tel: (301) 881-7900
(Minimum order 50 feet required)

5. If drain hose is not clogged, place check mark in appropriate space on Performance Test Sheet. If hose is clogged, refer to troubleshooting (table 6-8).

6. Turn FLOW SELECT valve (V2) to HIGH position and PRESSURE SELECT valve (V1) to the AIR TO CONC position. Ensure OXY ANALYZER (V3) valve is in OPEN position.

7. Adjust AIR PRESSURE CONTROL valve (RG1) until 15 psig at high pressure swing is indicated on AIR-OXY PRESSURE gage (G1).

8. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and adjust AIR PRESSURE CONTROL valve (RG1) until 15 psig at high pressure swing is indicated on AIR-OXY PRESSURE gage (G1).

9. Read INLET PRESSURE gage (G3) and record high/low pressure reading on Performance Test Sheet. The reading should not fall below 85 psig.

10. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inH₂O at high pressure swing is indicated on FLOW PRESSURE gage (G2).

11. Maintain 30 inH₂O (at high pressure swing) as indicated on FLOW PRESSURE gage (G2). Allow reading on % OXYGEN meter (M3) to stabilize for up to 15 minutes.

NOTE

If concentrator fails Oxygen Flow Test, ensure that the test set monitor is working properly. Refer to paragraph 6-30 for test set monitor test.

12. Record high/low pressure readings from AIR-OXY PRESSURE gage (G1) and % OXYGEN meter (M3) on Performance Test Sheet. Readings shall meet the requirement listed on the Performance Test Sheet.

13. Turn FLOW SELECT valve (V2) to MED position and repeat steps 7 through 12.

14. Turn FLOW SELECT valve (V2) to LOW position and repeat steps 7 through 12.

15. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

16. Turn FLOW SELECT valve (V2) to HIGH position.

17. Adjust AIR PRESSURE CONTROL valve (RG1) until 50 psig at high pressure swing is indicated on AIR-OXY PRESSURE gage (G1).

18. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and adjust AIR PRESSURE CONTROL valve (RG1) until 50 psig at high pressure swing is indicated on AIR-OXY PRESSURE gage (G1), and repeat steps 9 through 14.

19. If readings are within tolerance, secure test set and concentrator as follows:

20. Back off FLOW PRESSURE CONTROL (RG2) to obtain a zero pressure reading on FLOW PRESSURE gage (G2).

21. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

22. Back off AIR PRESSURE CONTROL valve (RG1) to obtain a zero pressure reading on AIR-OXY PRESSURE gage (G1).

23. Set CONC ON switch (S1) to OFF and set CONC FLOW valve (V4) and OXY ANALYZER valve (V3) to CLOSED.

24. Shut off shop air supply and ensure INLET PRESSURE gage (G3) indicates zero psig.

25. Set 28 VDC ON circuit breaker (CB1) and 115 VAC ON circuit breaker (CB2) to OFF. Turn off 28 Vdc power supply and 115 V 400 Hz power source to the test set.

26. Remove 28 Vdc cable assembly from the source of the 28 Vdc power supply and the test set. Install cap assembly onto the 28 Vdc connector (J10).

27. Remove 115 Vac cable assembly from the source of the 115 V, 400 Hz power source and the test set. Install cap assembly onto the 115 Vac connector (J12).

28. Remove hose assembly from filter assembly. Remove filter assembly from FILTER PORT (J1).

29. Remove oxygen outlet hose from the adapter and then remove the adapter from the concentrator.

30. Remove muffler assembly, interconnecting hoses and cables, and adapter assemblies from test set and the GGU-12/A oxygen concentrator.

31. Install protective shipping caps on GGU-12/A oxygen concentrator.

32. Install protective shipping caps on the inlet filter, cable assemblies, adapter assemblies, hose assemblies and muffler assembly and stow in test set lid.

33. Ensure the switches and valves are in the same position as in Test Set Up and Display Lamp Test (paragraph 6-32, steps 1 through 8).

34. Ensure that the test set cap, cover and screw assemblies are installed on their applicable fittings.

35. Place test set lid on test set case. Secure lid to case by using the 8 latches on the lid.

6-38. BENCH TEST USING TEST SET TTU-512A/E AND OBOGS ADAPTER ASSEMBLY P/N 3248AS200-1.



To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings, tools and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc). And any other combustible materials. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.



Do not lift or carry the GGU-12/A oxygen concentrator by the exhaust vent metallic tube assembly. Damage to the oxygen concentrator will occur.

NOTE

Paragraphs 6-39 through 6-44 contain the procedural steps for testing of the GGU-12/A concentrator utilizing Model Test Set TTU-518A/E with the OBOGS ADAPTER Assembly part number (3248AS200-1) as a work around test fixture only.

Figure 6-7 will be used for all index numbers throughout this procedure unless otherwise noted.

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—
As Required	Tubing, Plastic	CHEMFLUORAX-H00002

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly, Outlet	1779AS522-1
1	Adapter Assembly, Exhaust	1779AS524-1
1	Adapter Assembly, OBOGS	3248AS200-1
1	Cable Assembly, Concentrator	1779AS516-1
1	Cable Assembly, Power Supply	1779AS180-1
1	Cable Assembly, Power Supply	1779AS517-1
1	Concentrator Test Set, Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Hose Assembly, Inlet	1779AS133-1

Support Equipment Required (Cont)

Quantity	Description	Reference Number
1	Hose Assembly, Outlet	1779AS134-1
1	Hose Assembly, Oxygen	5SE01859-1
1	Muffler Assembly	1779AS578-1

6-39. Test Set Setup and Display Lamp Test. To set up the test set and check out its display lamps utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

- 1. Ensure test set lid is removed and circuit breaker INSTM ON (CB3) is in the RESET position (pushed in).
- 2. Open OBOGS ADAPTER assembly box (7). Remove TTU-518A/E lid from test set.
- 3. Turn valve (3) to the ON position.
- 4. Ensure test set circuit breakers 28 VDC ON (CB1), 115 VAC ON (CB2) and switch CONC ON (S1) are OFF.

5. Turn test set PRESSURE SELECT valve (V1) to OXY FROM CONC position.

6. Turn test set FLOW SELECT valve (V2) to LOW position.

NOTE

OXY ANALYZER (V3) and CONC FLOW (V4) are toggle valves. They are closed when the black handle is parallel to the panel assembly. They are open when the black handle is perpendicular to the panel assembly.

7. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are in the closed position.

NOTE

AIR PRESSURE CONTROL valve (RG1) will not be used for testing during this procedure at any time. Ensure valve is secured in accordance with step 8.

8. Ensure that the adjusting knob of AIR PRESSURE CONTROL (RG1) is turned counterclockwise four turns or until spring tension is released.

9. Cap test set FILTER PORT (J1) and AIR TO CONC (J4) ports.

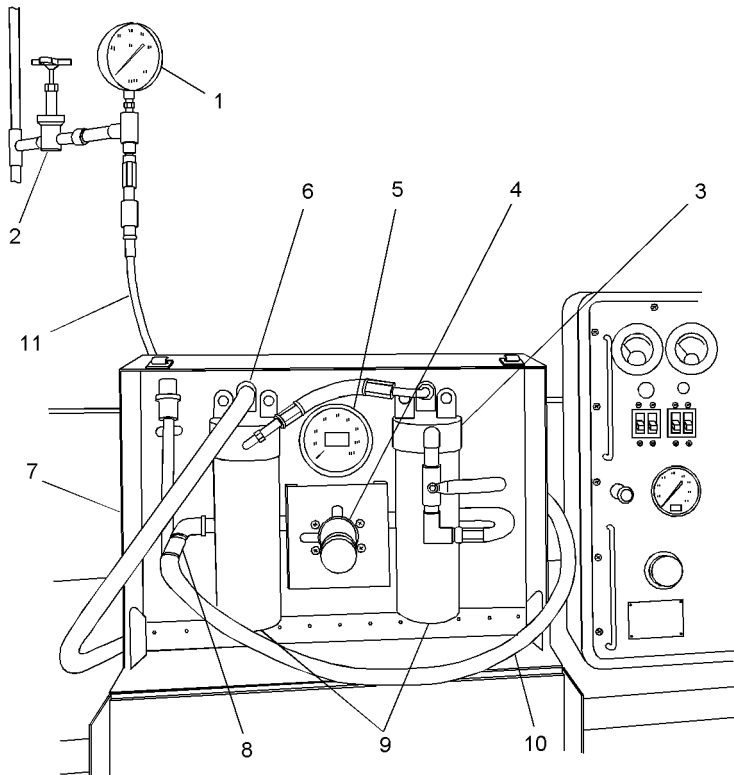


Figure 6-7. OBOGS Adapter Setup

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10. Ensure adjusting knob of FLOW PRESSURE CONTROL (RG2) is turned counterclockwise four turns or until spring tension is released.

11. Ensure test set vent next to FLOW PRESSURE gauge (G2) is clean and free of any foreign material.

12. Remove all hoses, cables, adapters and muffler from lid of concentrator test set.

13. Remove protective shipping covers from GGU-12/A concentrator cable assembly (P/N 1779AS516-1).

14. Remove cap assembly from 115V CONC POWER (J13) on test set.

15. Connect one end of concentrator cable assembly (P/N 1779AS516-1) to 115V CONC POWER (J13) and the other end to the concentrator.

16. Remove cap assembly from OXY FROM CONC (J3).

17. Remove protective shipping caps from outlet hose assembly (P/N 1779AS134-1). Connect one end of concentrator outlet hose to the GGU-12/A concentrator outlet adapter assembly (P/N 1779AS522-1). Connect assembly to OXY FROM CONC (J3). Connect the other end of outlet hose assembly to the concentrator outlet port.

18. Remove protective shipping plugs from OBOGS Adapter Assembly Outlet Hose Assembly (10). Connect one end of OBOGS Adapter Assembly Outlet Hose Assembly (10) To OBOGS Adapter Assembly Outlet Port (8). Connect other end of OBOGS Adapter Assembly Outlet Hose (10) to concentrator inlet port.



Do not restrict exhaust flow from concentrator by any other means than the muffler assembly (P/N 1779AS578-1).

19. Remove protective shipping cover from muffler assembly (P/N 1779AS578-1).

20. Connect muffler assembly to GGU-12/A exhaust adapter assembly (P/N 1779AS524-1). Remove protective shipping caps and connect assembly to the GGU-12/A oxygen concentrator exhaust port.

21. Remove protective shipping cap from OXY EXHAUST (JS) on concentrator test set.

NOTE

AIMD intermediate level maintenance shops will require an ON/OFF valve(2) and a 0 to

160 psig gage (1) or suitable substitutes installed on shop air supply source prior to the OBOGS Adapter Assembly Inlet. (Figure 6-7) shall be used for orientation of assembly.

22. Connect OBOGS Adapter Assembly Hose (11) to OBOGS Adapter Assembly INLET Port (6). Connect the other end of OBOGS Adapter Assembly Hose (11) to shop air source.

23. Ensure that the adjusting knob of OBOGS ADAPTER REGULATOR (4) is turned counterclockwise four turns or until spring tension is released.

24. Turn on shop air supply. Pressure will be indicated on Shop Air Supply gage (1). At no time during operation shall Shop Air Supply gage (1) fall below 75 psig during the high-pressure swing.

25. Open OBOGS Adapter Assembly Bleed Ports (9) 1/4 to 1/2 turn until a slight bleed is present.

26. Remove protective shipping caps assemblies from test set 28VDC connector (J10) and 115 VAC connector (J12).



Do not connect 28 VDC return and case ground together. Allow 28 VDC to float.

27. Connect 28 volt power cable assembly (P/N 1779AS180-1) to 28 VDC connector (J10) and to 28 volt DC power supply. Connector on power supply end of cable is (P/N MS3106A16-11P) Pin B is (28 V dc and pin A is return (negative). The connector shell is case ground.

28. Turn on power supply.



Hazardous voltages may be present on case of the test set if power plug and source are not connected to safety ground (green wire).

29. Connect 115V power cable assembly (P/N 1779AS517-1) to 115 VAC connector (J12). Connect the other end to a locally available mating power plug (rated at 6 amps) and connect the assembly to a 115 volt ac 400 Hz, 6 amp minimum power source. The black wire is high, the white wire is low and green wire is safety ground.

NOTE

% OXYGEN meter M3 will initially read 0.5% and should stabilize at approximately 20% or higher within 5 minutes.

30. Set 28 VDC ON circuit breaker (CB1) to ON. DS1 lamp and M3 meter will illuminate. RG4 HEATER lamp DS3 will illuminate then extinguish in approximately 3 minutes, indicating the monitor is operating within temperature limits.

31. Set 115 VAC ON circuit breaker (CB2) to ON. DS2 lamp will illuminate.

32. Push and release PUSH TO TEST DISPLAY button (S2). (DS3), (DS4), (DS5) and (DS6) lamps shall illuminate and extinguish and extinguish when S2 is released.

33. Leave all connections and valves unchanged and proceed to concentrator bench test.

6-40. 115V Motor Heater Current Test. To perform the 115V motor heater test, proceed as follows:



CONC ON switch (S1) power and OBOGS Adapter Assembly Pressure should be applied as close together as possible. Damage to the concentrator may occur if pressure is applied to concentrator prior to energizing the rotary valve motor. The rotary valve should not be energized for extended periods without air pressure applied to the concentrator.

1. Set CONC ON switch (S1) to ON and adjust OBOGS ADAPTER PRESSURE CONTROL KNOB (4) until OBOGS ADAPTER PRESSURE Gauge (5) indicates 50 PSIG on the high pressure swing. 115V HEATER lamp (DS6) will illuminate and then extinguish. Ensure audible operation of concentrator rotary valve motor and observe 115V motor meter (M2) for indication (.45 amps maximum). Record results of (DS6) test and (M2) meter reading on Performance Test Sheet.

2. Leave all connections and valves unchanged and proceed to next test.

6-41. 115V Motor Valve RPM Test. To perform the Motor Valve RPM Test proceed as follows:

NOTE

When performing steps 1 and 2, the motor valve rotates at 6.35 RPM. There are two sudden rapid pressure drops in pressure displayed on AIR/OXY PRESSURE gauge (G1), followed by a return to normal pressure per revolution. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to concentrator exhaust port.

1. Count the number of pressure drops that occur during the two-minute period. The number of pressure drops shall be 23 to 27. Record number of pressure drops on Performance Test Sheet.

2. Leave all connections and valves unchanged and proceed to next test.

6-42. Pressure Reducer Test. To perform the Pressure Reducer Test, proceed as follows:

1. Turn CONC FLOW valve (V4) to OPEN.

2. Ensure PRESSURE SELECT valve (V1) is set to OXY FROM CONC position.

3. Slowly adjust FLOW PRESSURE CONTROL valve (RG2) until FLOW PRESSURE gage (G2) indicates 30 inches of water on the high-pressure swing.

4. Adjust OBOGS ADAPTER PRESSURE CONTROL KNOB (4) until OBOGS ADAPTER PRESSURE gage (5) indicates 70 psig on the high pressure swing. AIR/OXYGEN PRESSURE gage (G1) should indicate 47.5 to 54 psig during high-pressure swing. Record reading from AIR/OXYGEN PRESSURE gage (G1) on Performance Test Sheet.

5. If reading is within tolerance, leave all connections and valves unchanged and proceed to internal leakage test.

6-43. Internal Leakage Test. To perform the Internal Leakage Test, proceed as follows:

1. Turn CONC FLOW valve (V4) to CLOSED

2. Adjust OBOGS ADAPTER ASSEMBLY PRESSURE CONTROL knob (4) until 10 psig is indicated on OBOGS ADAPTER PRESSURE gage (5) at the high-pressure swing.

3. Record initial reading from AIR/OXY PRESSURE gage (G1) on Performance Test Sheet and then wait one minute: pressure drop shall not exceed 3 psig. Record 1 minute reading on Performance Test Sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop after 5 minutes shall not exceed 15 psig. Record 5 minute reading on Performance Test Sheet.

4. If final reading for internal test is within tolerance, leave all connections and valves unchanged and proceed to Oxygen Flow Test.

6-44. Oxygen Flow Test/Filter Drain Flow Test. To perform the Oxygen Flow Test/Filter Drain Test, proceed as follows:



Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

When taking reading from AIR/OXY PRESSURE gage (G1) there will be a pressure swing; record both the low and high-pressure indications on the Performance Test Sheet.

NOTE

While performing the Oxygen Flow Test, ensure that while the concentrator is operating (CONC ON switch (S1) to ON) that the reading on OBOGS ADAPTER INLET gage (11) figure 1, sheet 3 has a peak reading of 75 psig or higher on the high pressure swing. If the pressure reading falls below 75 psig on the high swing, the air supply, concentrator filter assembly or OBOGS Adapter Filter System is inadequate and does not meet the specified requirements.

1. Remove filter drain hose (1, [figure 6-6](#)) from outlet adapter (2).

2. Verify air is bleeding through drain hose (1).

3. Verify air is not leaking from filter inlet assembly.

4. Install filter drain hose onto outlet adapter.

5. If drain hose is not clogged, place check mark in appropriate space provided on Performance Test Sheet. If hose is clogged, refer to troubleshooting [table 6-8](#).

6. Turn test set FLOW SELECT valve (V2) to HIGH position.

7. Place test set OXY ANALYZER valve (V3) and CONC FLOW valve (V4) to OPEN position.

8. Adjust OBOGS ADAPTER PRESSURE CONTROL knob (4) until 15 psig is indicated on AIR/OXY PRESSURE gage (G1) on the high-pressure swing.

9. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inches of water at high pressure swing is indicated on FLOW PRESSURE gage (G2).

10. Maintain 30 inches of water (at high-pressure swing) as indicated on FLOW PRESSURE gage (G2). Allow reading on % OXYGEN meter (M3) to stabilize approximately 5 minutes.

NOTE

If concentrator fails Oxygen Flow Test, ensure that test set monitor is working properly (refer to [paragraph 6-30](#) for test set monitor test).

11. Record pressure readings from Air Supply Gage (1), AIR/OXY PRESSURE gage (G1) and % OXYGEN meter (M3) on Performance Test Sheet. Readings shall meet the requirement listed on Performance Test Sheet.

12. Turn FLOW SELECT valve (V2) to MED position and repeat [steps 8 through 11](#).

13. Turn FLOW SELECT valve (V2) to LOW position and repeat [steps 8 through 11](#).

14. Turn FLOW SELECT valve (V2) to HIGH position.

15. Adjust OBOGS ADAPTER PRESSURE CONTROL knob (4) until 50 psig is indicated on AIR/OXY-GEN PRESSURE gage (G1) during the high pressure swing. Repeat [steps 9 through 13](#).

16. If readings are within tolerance secure test set, OBOGS Adapter Assembly and Concentrator as follows:

17. Back out OBOGS ADAPTER PRESSURE CONTROL knob (4) counterclockwise until a zero pressure reading is indicated on AIR/OXYGEN PRESSURE gage (G1).

18. Back out FLOW PRESSURE CONTROL Valve (RG2) counterclockwise until spring tension is released.

19. Set CONC ON switch (S1) to OFF.

20. Set CONC FLOW valve (V4) and OXY ANALYZER valve (V3) to CLOSED position.

NAVAIR 13-1-6.4-3

21. Set 28 VDC ON circuit breaker (CB 1) and 115 VAC ON circuit breaker (CB2) to OFF. Turn 28 VDC power supply and 115 volt 400 Hz power source to test set OFF.

22. Turn OBOGS Adapter Assembly Valve (3) to Off position.

23. Shutoff Air Source Supply Valve (2). Open OBOGS Adapter Assembly Bleed Ports (9) until Air source gauge (1) bleeds to zero psig.

24. Close Bleed Ports (9).

25. Remove OBOGS Adapter Assembly Inlet Hose (11) from OBOGS Adapter Assembly Inlet Connection (6) and Shop Air Source.

26. Disconnect OBOGS Adapter Assembly Outlet Hose (10) from OBOGS Adapter Assembly Outlet port (8) and concentrator inlet port.

27. Remove concentrator outlet hose assembly from concentrator outlet fitting (2) and OXY FROM CONC fitting (J3) of test set.

28. Remove muffler assembly from concentrator.

29. Remove 28 VDC cable assembly from 28-volt power supply and test set. Install cap assembly onto connector (J10) on test set.

30. Remove 115 VAC cable assembly from source of 115 volt, 400 Hz source and test set. Install cap assembly onto connector (J12) on test set.

31. Install protective shipping caps on all removed components and store in lid of test set.

32. Ensure test set switches and valves are in the same position as in test set up [paragraph 6-32, steps 1 through 8](#).

33. Ensure that test set caps, cover and screw assemblies are installed on their applicable fittings.

34. Stow all test set components in test set, place test set lid on test set case. Secure lid to case by using the 8 latches attached to lid.

35. Stow all OBOGS ADAPTER assembly hoses in box and secure box.

6-45. TROUBLESHOOTING.

6-46. Troubleshooting is prepared in a logical sequence. Due to the complete wiring and etc., each step will identify the type of test or inspection (with tolerances) to be performed with the expected end results. All tests and steps permit only two outcomes. Each item to be replaced is identified in replacement steps. After performing a repair task, recheck the operation of the concentrator component. If the malfunction is corrected, that is the end of the procedure; if not,

proceed to the next step in the troubleshooting table or to the next troubleshooting table indicated. Once the malfunction has been corrected, return to Bench Test procedures and continue testing the concentrator. Troubleshoot the concentrator using the procedure outlined in [tables 6-2 through 6-8](#).

Materials Required		
Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—
As Required	Compound, Leak Detection, Type 1	MIL-L-25567

Support Equipment Required		
Quantity	Description	Reference Number
1	Adapter Assembly, Outlet	1779AS522-1
1	Adapter Assembly, Exhaust	1779AS524-1
1	Cable Assembly, Concentrator	1779AS516-1
1	Cable Assembly, Power Supply	1779AS180-1
1	Cable Assembly, Power Supply	1779AS517-1
1	Concentrator Test Set, Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Hose Assembly, Inlet	1779AS133-1
1	Hose Assembly, Outlet	1779AS134-1
1	Hose Assembly, Oxygen	5SE01859-1
1	Muffler Assembly	1779AS578-1

6-47. DISASSEMBLY.

6-48. Disassemble GGU-12/A concentrator using index numbers assigned to figure referred to unless otherwise noted. Disassemble GGU-12/A concentrator only as far as required to correct any malfunction. Some components can be removed from the concentrator without first removing mounting plate (1, [figure 6-10](#)) and/or stabilizer plate (5, [figure 6-9](#)).

Table 6-2. Troubleshooting (Heater Lamp (Illuminates and Does Not Extinguish))

Trouble	Probable Cause	Remedy
Test Set 115 V Heater Lamp (DS6) illuminates and does not extinguish.	Special cable assembly Junction box assembly thermal resistor (RT1).	Isolate and repair by performing steps below.
<ol style="list-style-type: none"> 1. Turn 115V AC ON circuit breaker (CB2) to off position. 2. Disconnect J2 from junction box assembly. 3. Allow concentrator heater assembly and inlet filter assembly to cool to room temperature. 4. Using an ohmmeter, measure resistance between special cable assembly connector (J2) pins (22) and (21). <ol style="list-style-type: none"> a. If resistance is between 8.5 kohm and 11.5 kohm, go to step 6. b. If resistance is above 11.5 kohm, go to step 5. 5. Remove cable assembly EMI cover and measure resistance of thermal resistor (RT1). <ol style="list-style-type: none"> a. If resistance is between 8.5 kohm and 11.5 kohm, replace special cable assembly. b. If resistance is above 11.5 kohm, replace thermal resistor (RT1). 6. Replace junction box assembly. 		

Table 6-3. Troubleshooting (Pressure Reducer)

Trouble	Probable Cause	Remedy
AIR-OXY PRESSURE gage (G1) indicates above 54 psig.	Pressure reducer.	Replace pressure reducer.
AIR-OXY PRESSURE gage (G1) indicates below 47.5 psig.	Pressure reducer.	Replace pressure reducer.

Table 6-4. Troubleshooting (Heater Lamp (Does Not Illuminate))

Trouble	Probable Cause	Remedy
Test Set 115 V Heater LAMP (DS6) does not illuminate.	Special cable assembly. Heater assembly. Junction box assembly. Thermal resistor (RT1). Thermostatic switch.	Isolate and repair by performing steps below.
<ol style="list-style-type: none"> 1. Turn 115 VAC ON circuit breaker (CB2) to off position. 2. Disconnect connector (J2) from junction box assembly. 3. Turn 115 VAC ON circuit breaker (CB2) to on position and measure 115 V between pins (9, 115 V) and (8, return). <ol style="list-style-type: none"> a. If voltage is not present, replace special cable assembly. b. If voltage is present, proceed to step 4. 4. Turn 115 VAC ON circuit breaker (CB2) to off position and allow concentrator heater assembly and inlet filter assembly to cool to room temperature. Using an ohmmeter, measure between pins (22) and (21) of special cable assembly connector (J2). <ol style="list-style-type: none"> a. If resistance is between 8.5 kohms and 11.5 kohms, go to step 6. b. If resistance is below 8.5 kohms, replace thermal resistor (RT1). 5. Using an ohmmeter, measure resistance between special cable assembly connector (J2) pins (10) and (11). <ol style="list-style-type: none"> a. If resistance is between 24 ohms and 27 ohms, go to step 7. b. If resistance is above 27 ohms, go to step 6. 6. Remove cable assembly electrical box cover. Using an ohmmeter, measure resistance between heater assembly electrical leads. <ol style="list-style-type: none"> a. If resistance is between 24 ohms and 27 ohms, replace special cable assembly. b. If resistance is above 27 ohms, replace heater assembly. 7. Using an ohmmeter, measure resistance between special cable assembly connector (J2) pins (17) and (19). <ol style="list-style-type: none"> a. If resistance is below 2 ohms, go to step 8. b. If resistance is above 2 ohms, replace junction box assembly. 8. Remove special cable assembly switch cover. Using an ohmmeter, measure resistance between VIO and BLU wires. <ol style="list-style-type: none"> a. If resistance is 2 ohms or below, replace special cable assembly. b. If resistance is above 2 ohms, replace thermostatic switch. 		

Table 6-5. Troubleshooting (Motor)

Trouble	Probable Cause	Remedy
115 V MOTOR (M2) ammeter exceeds 0.3 amps.	Special cable assembly. Junction box assembly. Rotary valve assembly.	Isolate and repair by performing steps below.
<ol style="list-style-type: none"> Turn 115 VAC ON circuit breaker (CB2) to off position. Disconnect J2 from junction box assembly and observe ammeter (M2). Turn 115 VAC ON circuit breaker (CB2) to on position. <ol style="list-style-type: none"> If current exceeds reading obtained in step 2, replace special cable assembly. If current reading is the same as the reading obtained in step 2, go to step 4. Turn 115 VAC ON circuit breaker (CB2) to off position. Disconnect connector from rotary valve assembly and using an ohmmeter measure between connector pins (WHT)-(YEL), (WHT)-(RED), (YEL)-(RED) and (WHT), (YEL), (RED) to chassis ground respectively. <ol style="list-style-type: none"> If any reading is less than infinite, replace special cable assembly. If all readings are infinite, ensure pins are isolated from one another and go to step 6. Reconnect J2 to junction box assembly. Turn 115 VAC ON circuit breaker (CB2) to on position. <ol style="list-style-type: none"> If current exceeds reading obtained in step 2, replace junction box assembly. If current reading is the same as the reading obtained in step 2, replace rotary valve assembly. 		

Table 6-6. Troubleshooting (Rotary Valve)

Trouble	Probable Cause	Remedy
Rotary valve does not operate, no pressure cycles (high to low flow) at output of concentrator.	Special cable assembly. Junction box assembly. Rotary valve assembly.	Isolate and repair by performing steps below.
<ol style="list-style-type: none"> Disconnect J2 from junction box assembly and measure 115 V between pins (7, 115 V) and (8, return). <ol style="list-style-type: none"> If voltage is not present, replace special cable assembly. If voltage is present, proceed to step 2. Disconnect connector from rotary valve assembly and measure 115 V between connectors (WHT) 115 V and (YEL) return. <ol style="list-style-type: none"> If voltage is not present, replace junction box assembly. If voltage is present, replace rotary valve assembly. 		

Table 6-7. Troubleshooting (Internal/External Leakage)

Trouble	Probable Cause	Remedy
Internal/external leakage exceeds 3 psig per minute or 15 psig in 5 minutes.	Foreign material dirt, loose screws, defective preformed packing etc. Check valve assemblies defective.	Isolate and repair by performing steps below.
<p style="text-align: center;">NOTE</p> <p>Ensure all test set hose assemblies from test set concentrator are properly attached and not leaking.</p> <ol style="list-style-type: none"> 1. Using leak detection compound inspect concentrator for external leakage as indicated by bubbles. <ol style="list-style-type: none"> a. If external leak is detected, visually inspect for foreign matter, defective component parts or other obvious damage; clean, repair, or replace component parts as necessary and continue Bench Test. b. If no external leak is detected and check valve assemblies were not replaced in step 1a, remove and replace check valve assemblies and continue Bench Test. 		

Table 6-8. Troubleshooting (Oxygen Flow Test/Filter Drain Flow Test)

Trouble	Probable Cause	Remedy
	<p style="text-align: center;">NOTE</p> <p>When troubleshooting Oxygen Flow Test only, perform one probable cause and remedy at a time, then return to Bench Test to see if concentrator passes Oxygen Flow Test.</p>	
No air flow detectable through filter drain hose.	Filter drain path is clogged.	<ol style="list-style-type: none"> 1. Remove hose. 2. Check for air flow at hose barb. 3. If there is air flow at hose barb, replace hose. 4. If there is no air flow at hose barb, remove and replace inlet filter assembly.
Concentrator does not produce minimum required oxygen % during flow test or AIR-OXY PRESSURE gage (G1) readings do not fall within minimum and maximum allowable tolerances.	<p>Oxygen monitor of test set may need replacing.</p> <p>Filter tube element dirty and clogged.</p> <p>Sieve beds contaminated.</p>	<p>Perform Test Set Monitor Test. Refer to appropriate support equipment technical manual.</p> <p>Replace filter tube element.</p> <p>Replace sieve beds.</p>

CAUTION

All disassembly, inspection, repair, and assembly must be done on clean benches having good lighting and in an area provided with air conditioning or air filtering. Walls, floor, and ceiling should have a smooth finish and be painted with non-chalking paint which can be kept clean and dust free.

NOTE

It is desirable to keep all parts for each individual component separated. Make careful note of the location and quantity of all parts. Plastic portioned boxes with covers or similar storage partitioned boxes with covers or similar storage facilities should be used to keep the parts segregated and protected from dirt and moisture. Plastic bags are also useful for storing subassemblies and component parts after cleaning and inspection until ready for assembly.

Materials Required

Quantity	Description	Reference Number
1	Plexiglas or Equivalent, 10 Inches Square	—
10	Nuts, 4/40	—
10	Screw, Machine, 4/40 X 1 Inch	—

NOTE

For local manufacture of part peg board (1, figure 6-8), proceed as follows:

1. Cut out a board (1), approximately 10 inches square, from suitable material (e.g., Plexiglas or equivalent).
2. Draw circles and spacer outlines, label as shown.
3. Drill holes (1/8 inch) in each outline, approximate location as shown.
4. Insert 4/40 machine screws approximately 1 inch long and secure with nuts.

6-49. STABILIZER PLATE REMOVAL. To remove the Stabilizer Plate, proceed as follows:

Materials Required

Quantity	Description	Reference Number
5	Setscrew	MIL51963-55
3	Setscrew	MS51963-30
2	Setscrew	MS51964-71

Support Equipment Required

Quantity	Description	Reference Number
1	Board, Peg	Fabricate IAW figure 6-8
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002

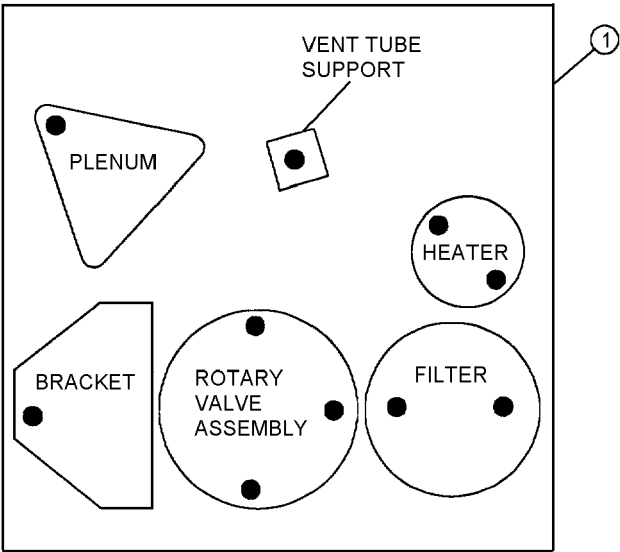
WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen equipment. Oil, even in minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous.

NOTE

Index numbers refer to figure 6-9 unless otherwise noted.

1. Remove cotter pins (1) and webbing strap (2).



006008

Figure 6-8. Peg Board for Washers/Spacers

- 2. Unfasten and remove concentrator shroud (3).



When removing screws from stabilizer plate, it may be necessary to heat screws to facilitate removal. The heat gun can generate extreme heat that can cause severe burns.

- 3. Remove four machine screws (4) securing stabilizer plate (5) to molecular sieve bed assemblies (6).

- 4. Remove three machine screws (7) and flat washers (8) securing stabilizer plate (5) to junction box bracket (9). Replace machine screws (7) with three setscrews (MS51963-30) to retain spacers (10) during disassembly.

- 5. Carefully cut lockwire, and remove three hex nuts (11) and flat washers (12) securing stabilizer plate (5) to plenum assembly (13).

- 6. Remove one machine screw (14) and flat washer (15) securing stabilizer plate (5) to vent tube support (16). Replace machine screw (14) with setscrew (MS51963-55) to retain flat washers (17) during disassembly.

- 7. Remove four machine screws (18) and flat washers (19) securing stabilizer plate (5) to electrical-mechanical posts (20). Replace machine screws (18) with setscrews (MS51963-55) to retain flat washers (21) during disassembly.

- 8. Carefully cut lockwire, and remove two hex nuts (22) and flat washers (23) securing stabilizer plate (5) to inlet filter assembly (24).

- 9. Carefully cut lockwire, and remove two hexagon cap screws (25) and flat washers (26) securing stabilizer plate (5) to heater assembly (27). Replace hexagon cap screws (25) with setscrews (MS51964-71) to retain heater spacers (28), nonmetallic washers (29), and flat washers (30) during disassembly.

- 10. Remove stabilizer plate (5) and concentrator shroud (34) from concentrator.

NOTE

When removing height adjustment washers and spacers from concentrator, place in appropriate location on peg board (figure 6-8) as removed. During assembly, the height adjustment washers and spacers must be replaced in the same location.

- 11. Remove spacers (10) and place in appropriate location on peg board for storage. Repeat for shims (31), flat washers (17), flat washers (21), heater spacers (28), nonmetallic washers (29) and flat washers (30).

- 12. Remove electrical-mechanical post (32) and flat washers (33) from inlet filter assembly (24), and place flat washers (33) in appropriate location on peg board for storage.

- 13. Remove setscrews temporarily installed for disassembly procedures in junction box bracket (9), vent tube support (16), electrical-mechanical posts (20), and heater assembly (27).

6-50. MOUNTING PLATE REMOVAL. To remove the Mounting Plate, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002

NOTE

Index numbers refer to figure 6-10 unless otherwise noted.

- 1. Turn concentrator over and place on work bench so that mounting plate assembly (1) is on top.



When removing screws from mounting plate, it may be necessary to heat screws to facilitate removal. The heat gun can generate extreme heat that can cause severe burns.

- 2. Remove eight machine screws (2) securing mounting plate assembly (1) to molecular sieve bed assemblies (3).

- 3. Remove four machine screws (4) securing mounting plate assembly (1) to junction box assembly (5).

- 4. Remove two machine screws (6) securing mounting plate assembly (1) to rotary valve assembly (7).

5. Remove three machine screws (8) securing mounting plate assembly (1) to oxygen fitting (9).

6. Remove two machine screws (10) securing mounting plate assembly (1) to heater assembly (11).

7. Remove three machine screws (12) securing mounting plate assembly (1) to electrical box (13).

8. Carefully turn concentrator over so that it is resting on the mounting plate assembly (1) to provide access, and remove socket head cap screw (14), lockwasher (15), and flat washer (16) securing ground terminal (17) to mounting plate assembly (1).

9. Carefully cut lockwire, and remove machine screw (19) and flat washer (20) from mounting plate assembly (1).

10. Separate mounting plate assembly (1) from concentrator.

11. Remove concentrator shroud (21), cushion disk (18) and ring spacers (22) from mounting plate assembly (1). Remove machine screw (23), flat washer (24) and strap assembly (25). Remove machine screw (26) and flat washer (27) and strap assembly (28).

6-51. SHROUD ASSEMBLY REMOVAL. To remove the Shroud Assembly, proceed as follows:

1. Unfasten and remove concentrator shroud (3, figure 6-9).

2. Remove stabilizer plate, refer to Stabilizer Plate Removal (paragraph 6-49).

3. Remove mounting plate, refer to Mounting Plate Removal (paragraph 6-50).

4. Remove concentrator shroud from stabilizer plate and discard.

5. Remove concentrator shroud from mounting plate and discard.

6-52. PRESSURE REDUCER ASSEMBLY REMOVAL. To remove the Pressure Reducer Assembly, proceed as follows:

NOTE

Index numbers refer to figure 6-11 unless otherwise noted.

Ensure that concentrator is positioned so that the components are upright.

1. Remove two socket head cap screws (11), lockwashers (12), and flat washers (13) to disconnect the metallic bent tube assembly (10) from the inlet filter assembly (14).

2. Remove two socket head cap screws (37), lockwashers (38), and remove the pressure reducer assembly (39) from the rotary valve assembly (5). Remove and discard the preformed packing (40).

3. Remove two socket head cap screws (7), spring lockwashers (8), and flat washers (9) to disconnect the metallic bent tube assembly (10) from the pressure reducer assembly (39).

4. Remove the metallic bent tube assembly (10), and remove and discard preformed packings (15) and (16).

5. Remove electrical-mechanical post (46) and hex nut (47).

6-53. ROTARY VALVE ASSEMBLY REMOVAL. To remove the Rotary Valve Assembly, proceed as follows:

NOTE

Index numbers refer to figure 6-11 unless otherwise noted.

1. Remove two machine screws (31) to detach rotary valve assembly (5) from mounting plate assembly (32).

2. Carefully cut and remove electrical tiedown straps (28).

3. Remove electrical-mechanical post (41) from rotary valve assembly (5).

4. Remove four socket head cap screws (21), lockwashers (22), and flat washers (23) to disconnect metallic bent tube assembly (20) and metallic tube assembly (27) from molecular sieve bed assembly (24).

5. Remove two socket head cap screws (11), lockwashers (12), and flat washers (13) to disconnect the metallic bent tube assembly (10) from the inlet filter assembly (14).

6. Remove two socket head cap screws (1), lockwashers (2), and flat washers (3), and remove metallic tube assembly (4) from rotary valve assembly (5). Remove and discard preformed packing (6).

6A. Using inlet filter drain tube pliers (P/N 3309311-1) remove non-metallic tube from rotary valve vent tube and inlet filter assembly.

NOTE

If new rotary valve, P/N 1657420-1, is installed, perform step 6B.

6B. Using inlet filter drain pliers (part no. 3309311-1), remove non-metallic tube from bottom corner of rotary valve and metallic tube (rotary valve vent tube).

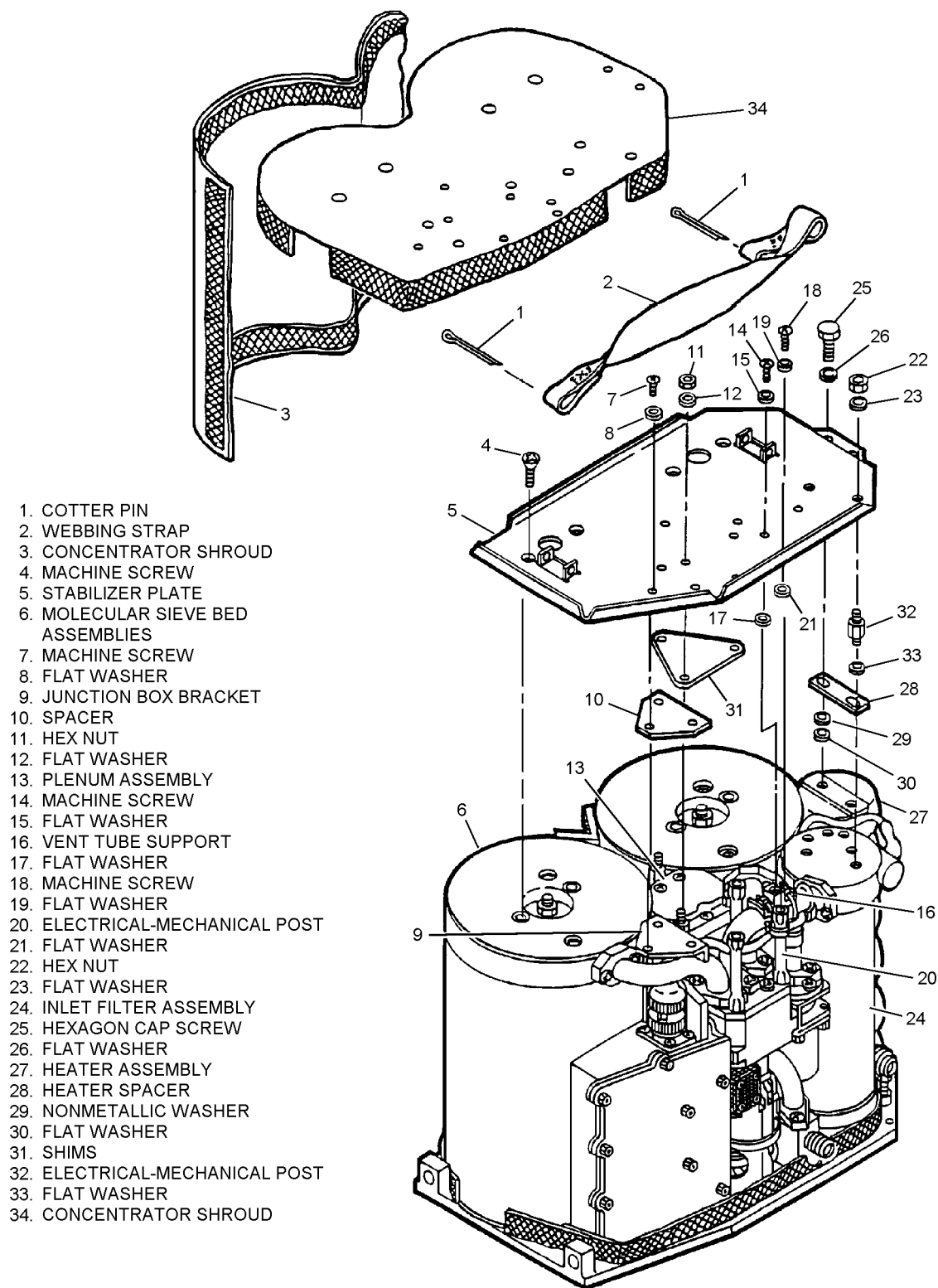


Figure 6-9. Shroud Assembly/Stabilizer Plate Removal/Installation

006009

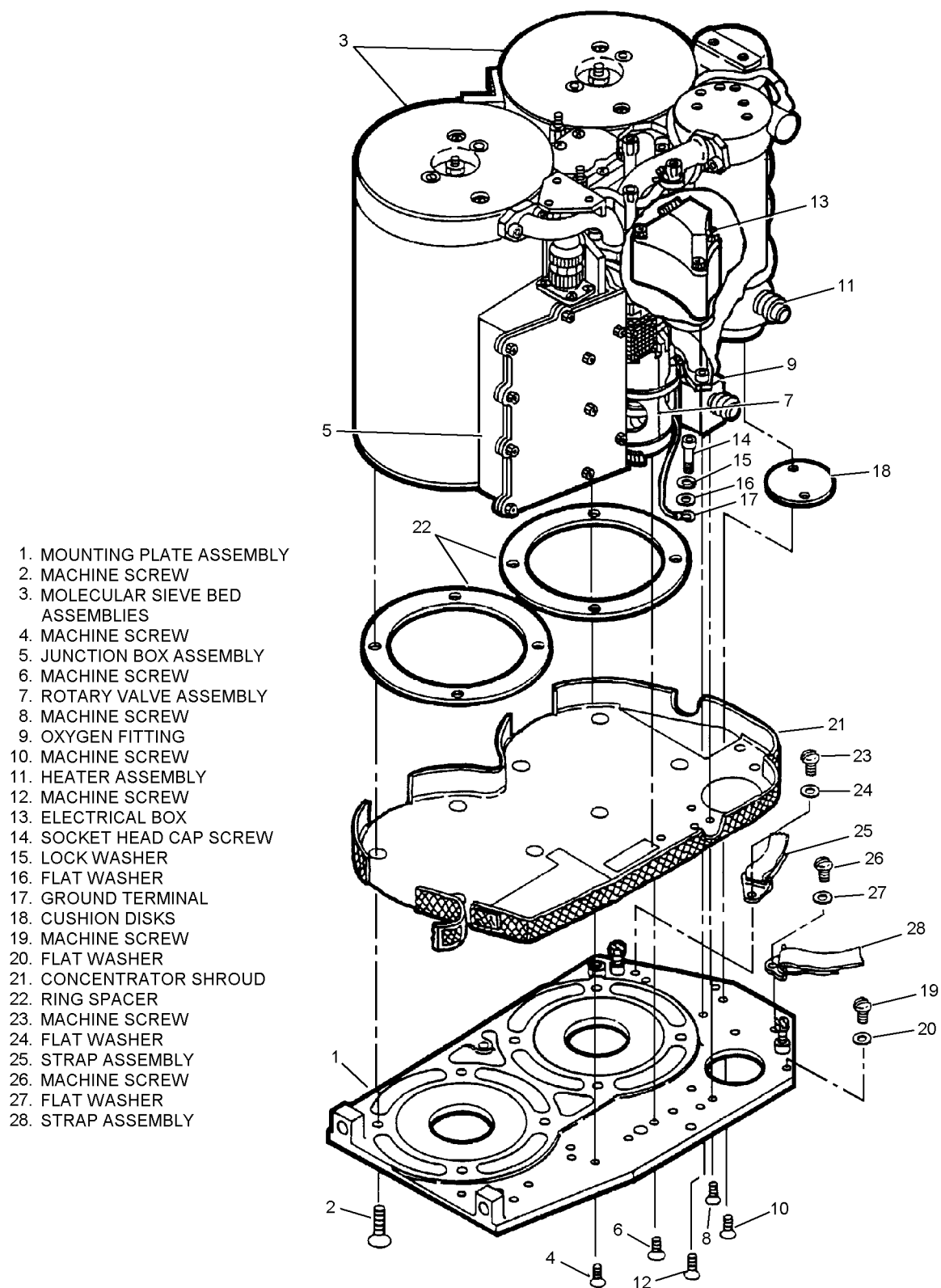


Figure 6-10. Shroud Assembly/Mounting Plate Removal/Assembly

006010

7. Carefully cut insulation sleeving and disconnect male/female connectors on RED, WHT and YEL wires extending from rotary valve electrical connector (29) from male/female connectors on RED, WHT and YEL wires extending from cable assembly electrical connector (30).

8. Remove socket head cap screw (42), lockwasher (43), flat washer (44) and ground lug (45) from mounting plate assembly (32). Remove rotary valve assembly, with attached components, from concentrator.

9. Remove two socket head cap screws (37) and lockwashers (38), and then remove the pressure reducer assembly (39) from the rotary valve assembly (5). Remove and discard the preformed packing (40).

10. Remove two socket head cap screws (17), lockwashers (18), and flat washers (19) to disconnect the metallic bent tube assembly (20) from the rotary valve assembly (5).

11. Remove the metallic bent tube assembly (20), and remove and discard preformed packings (25) and (26).

12. Repeat [step 10](#) and [11](#) for the other metallic tube assembly (27).

13. Remove hose clamps (33) and (34), and carefully separate the motor mount halves (35) and loop clamp (36) from motor.

6-54. PLENUM ASSEMBLY REMOVAL. To remove the Plenum Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Remove two socket head cap screws (1), lockwashers (2), and flat washers (3) to disconnect metallic tube assembly (4) from oxygen fitting (5).

2. Remove two spring tension clips (7) on sleeve bushings (8).

3. Retract two sleeve bushings (8) from molecular sieve bed assemblies (10) and (11) by sliding sleeve bushings (8) into plenum assembly (9). This procedure will free plenum assembly (9) from molecular sieve bed assemblies (10) and (11).

4. Remove two sleeve bushings (8), and remove and discard two preformed packings (12) from plenum assembly (9). Remove and discard two preformed pack-

ings (13) from molecular sieve bed assemblies (10) and (11).

5. Carefully lift the plenum assembly (9) for access to socket head cap screws (14).

6. Remove two socket head cap screws (14), lockwashers (15), flat washers (16), and metallic tube assembly (4) from the plenum assembly (9).

7. Remove and discard preformed packing (6) and (17).

6-55. PLENUM ASSEMBLY DISASSEMBLY. To disassemble the Plenum Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Remove electrical-mechanical post (28) from plenum (24).

2. Remove two special bolts (20), three machine screws (21), lockwashers (22) and manifold (23) from plenum (24).

3. Remove and discard two machine screws (29) and two preformed packings (12).

4. Remove three machine screws (30) and plenum cover (31) from plenum (24).

5. Remove machine screw (32), lockwashers (33), fluid filtering disk (34), and fluid filter element (35) from plenum cover (31).

6. Remove and discard preformed packings (36) and (37), two preformed packings (27) and two preformed packings (26).

7. Remove two check valves (25).

6-56. CHECK VALVE ASSEMBLY REMOVAL. To remove the Check Valve Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Remove two electrical-mechanical posts (20).

2. Retract two sleeve bushings (8) from molecular sieve bed assemblies (10) and (11) by sliding sleeve bushings (8) into plenum assembly (9). This procedure will free plenum assembly from molecular sieve bed assemblies.

3. Remove three machine screws (21), and lockwashers (22) securing manifold (23) to plenum (24).

4. Remove manifold (23) and two check valves (25).

5. Remove two sleeve bushings (8), and remove and discard two preformed packings (12) from manifold (23). Remove and discard two preformed packings (13) from molecular sieve bed assemblies (10) and (11).

6. Remove and discard preformed packings (26) and (27).

6-57. OXYGEN FITTING REMOVAL. To remove the Oxygen Fitting, proceed as follows:

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Remove three machine screws (18) to detach oxygen fitting (5) from mounting plate assembly (19).

2. Remove two socket head cap screws (1), lockwashers (2), and flat washers (3) to detach metallic tube assembly (4) from oxygen fitting (5).

3. Carefully slide oxygen fitting (5) from the concentrator. Remove and discard preformed packing (6).

6-58. JUNCTION BOX ASSEMBLY REMOVAL. To remove the Junction Box Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Remove two socket head cap screws (5), spring lockwashers (6), flat washers (7), and junction box bracket (8) from junction box assembly (2).

2. Disconnect special cable assembly electrical connector J2 (1) from connector on junction box assembly (2).

3. Remove four machine screws (3) and junction box assembly (2) from mounting plate assembly (4).

4. Remove two damping pads (28) from junction box assembly (2).

6-59. FILTER ELEMENT TUBE REMOVAL. To remove the Filter Element Tube, proceed as follows:

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Cut lockwire (17) and remove special bolt (16) from bottom of concentrator assembly.

2. Remove helical retainer (29) and support cup (30).

3. Grasp filter housing sleeve (31) and push down to separate filter housing sleeve from inlet filter housing (32) and expose water trap (32A) with seat (32B), and filter element (33) attached.

4. To allow for removal of water trap (32A) and disassembly of the filter housing sleeve (31) from the filter base (34), insert a small bladed screwdriver above metal on the top of water trap (32A). Push down on the top of water trap (32A) and while holding against the spring tension, tilt water trap and filter housing sleeve toward the front of the concentrator and out from under inlet filter housing (32).

5. Remove filter mount base (34) with filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), and inlet filter housing (32) with all attached parts.

6. Remove filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), helical retainers (35 and 36), and helical spring (37) from filter mount base (34).

7. Remove and discard seat (32B) and filter element tube (33) from water trap (32A).

NOTE

Water trap (32A) and seat (32B) are new items and must be ordered and installed during reassembly of the inlet filter assembly.

8. Remove and discard preformed packings (38), (39), (40) and (41).

6-60. INLET FILTER ASSEMBLY REMOVAL. To remove the Inlet Filter Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Remove four screws (9) from inlet filter housing.

2. Remove cable assembly EMI cover (11) and thermal resistor (12) from the inlet filter housing (32).

3. Remove and discard preformed packing (13).

4. Remove inlet filter housing (32) from heater assembly (23).

5. Remove and discard preformed packing (24).

1. SOCKET HEAD CAP SCREW
2. LOCK WASHER
3. FLAT WASHERS
4. METALLIC TUBE ASSEMBLY
5. ROTARY VALVE ASSEMBLY
6. PREFORMED PACKING
7. SOCKET HEAD CAP SCREW
8. SPRING LOCK WASHER
9. FLAT WASHER
10. METALLIC BENT TUBE ASSEMBLY
11. SOCKET HEAD CAP SCREW
12. LOCK WASHER
13. FLAT WASHER
14. INLET FILTER ASSEMBLY
15. PREFORMED PACKING
16. PREFORMED PACKING
17. SOCKET HEAD CAP SCREW
18. LOCK WASHER
19. FLAT WASHER
20. METALLIC BENT TUBE ASSEMBLY
21. SOCKET HEAD CAP SCREW
22. LOCK WASHER
23. FLAT WASHER
24. MOLECULAR SIEVE
BED ASSEMBLIES
25. PREFORMED PACKING
26. PREFORMED PACKING
27. METALLIC TUBE ASSEMBLY
28. ELECTRICAL TIEDOWN STRAP
29. ROTARY VALVE
ELECTRICAL CONNECTOR
30. CABLE ASSEMBLY
ELECTRICAL CONNECTOR
31. MACHINE SCREW
32. MOUNTING PLATE ASSEMBLY
33. HOSE CLAMP
34. HOSE CLAMP
35. MOTOR MOUNT HALVES
36. LOOP CLAMP
37. SOCKET HEAD CAP SCREW
38. LOCK WASHER
39. PRESSURE REDUCER ASSEMBLY
40. PREFORMED PACKING
41. ELECTRICAL-MECHANICAL POST
42. SOCKET HEAD CAP SCREW
43. LOCK WASHER
44. FLAT WASHER
45. GROUND LUG
46. ELECTRICAL-MECHANICAL POST
47. HEX NUT

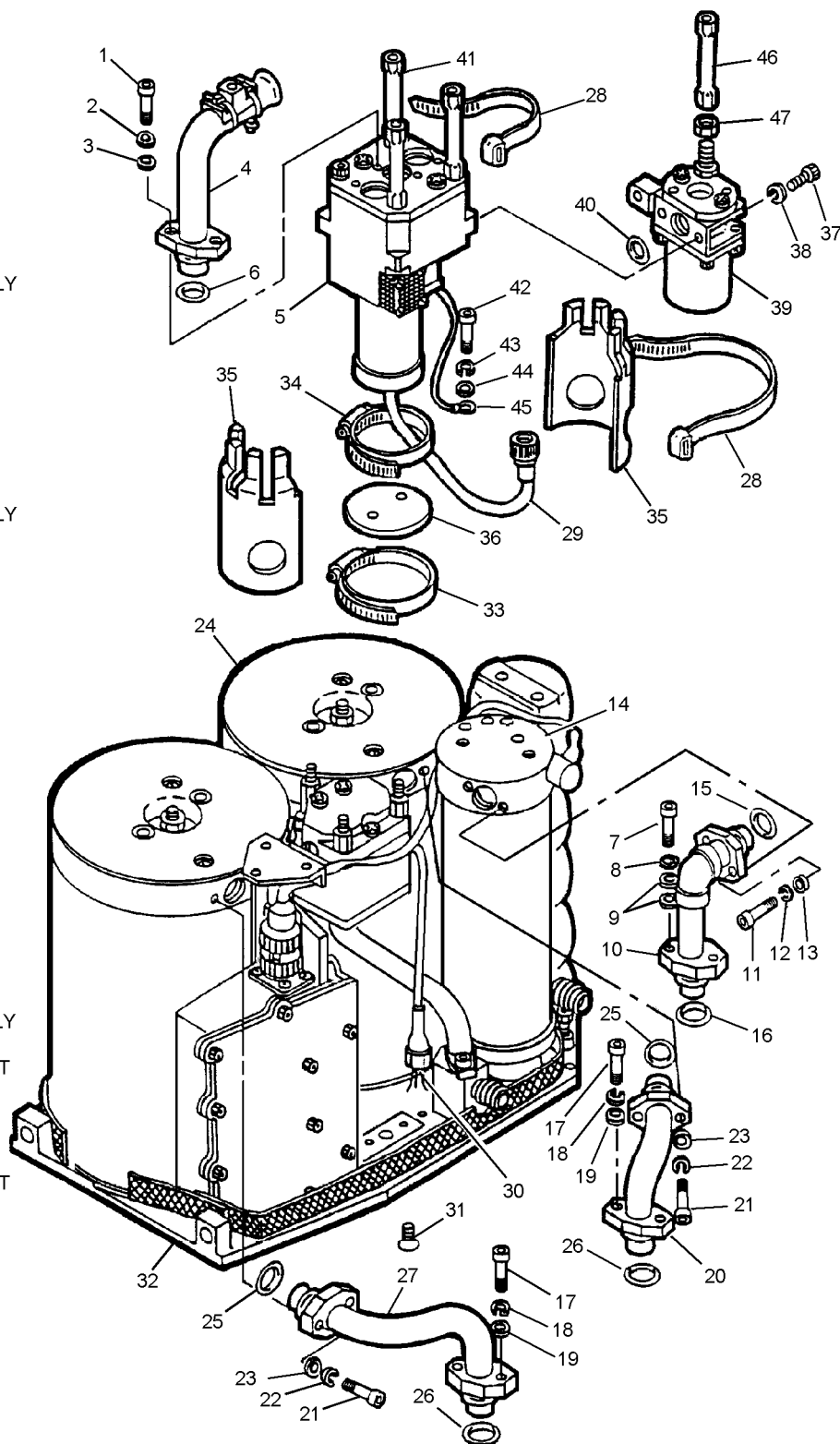


Figure 6-11. Rotary Valve Assembly/Pressure Reducer Assembly Removal/Assembly

006011

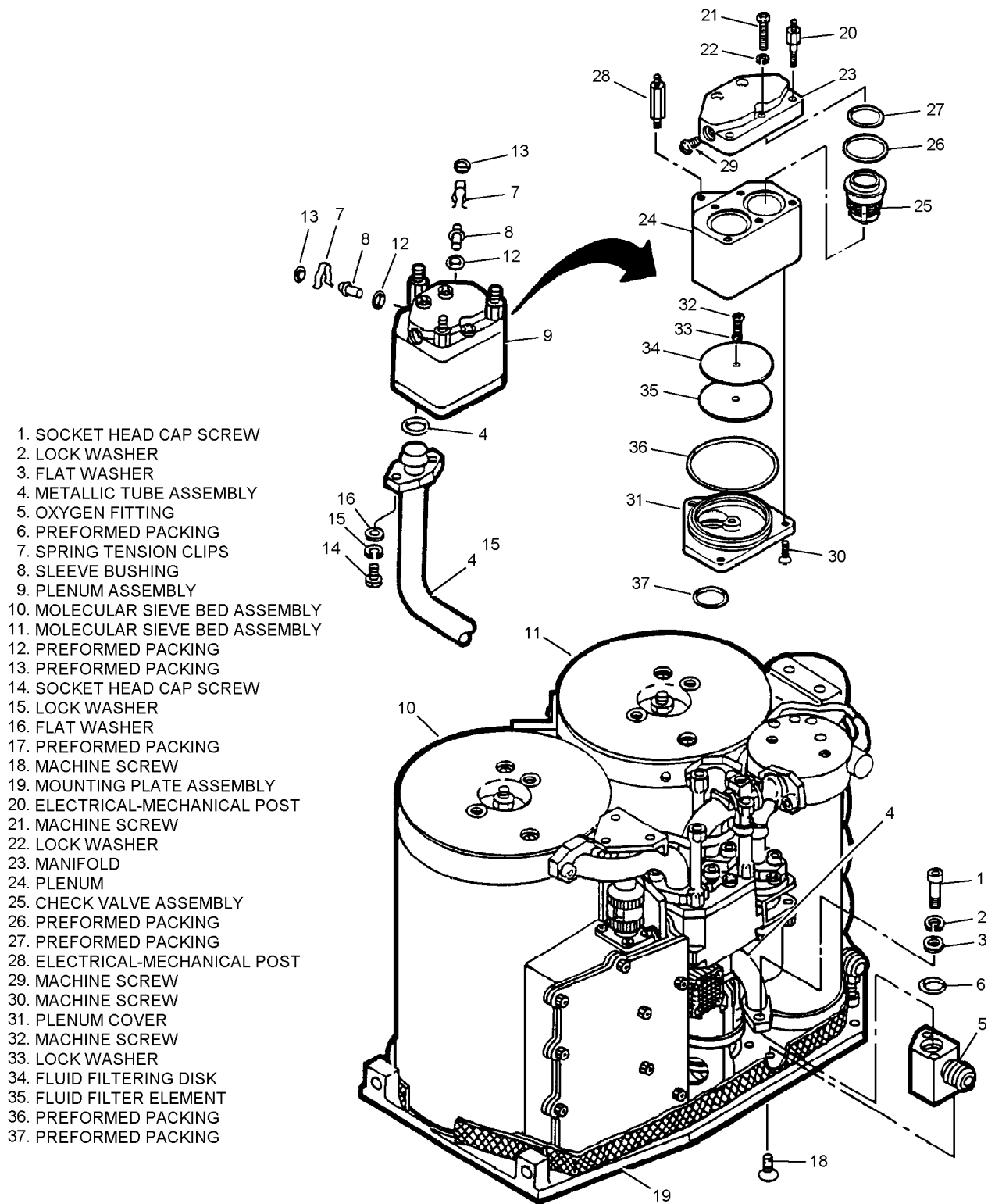
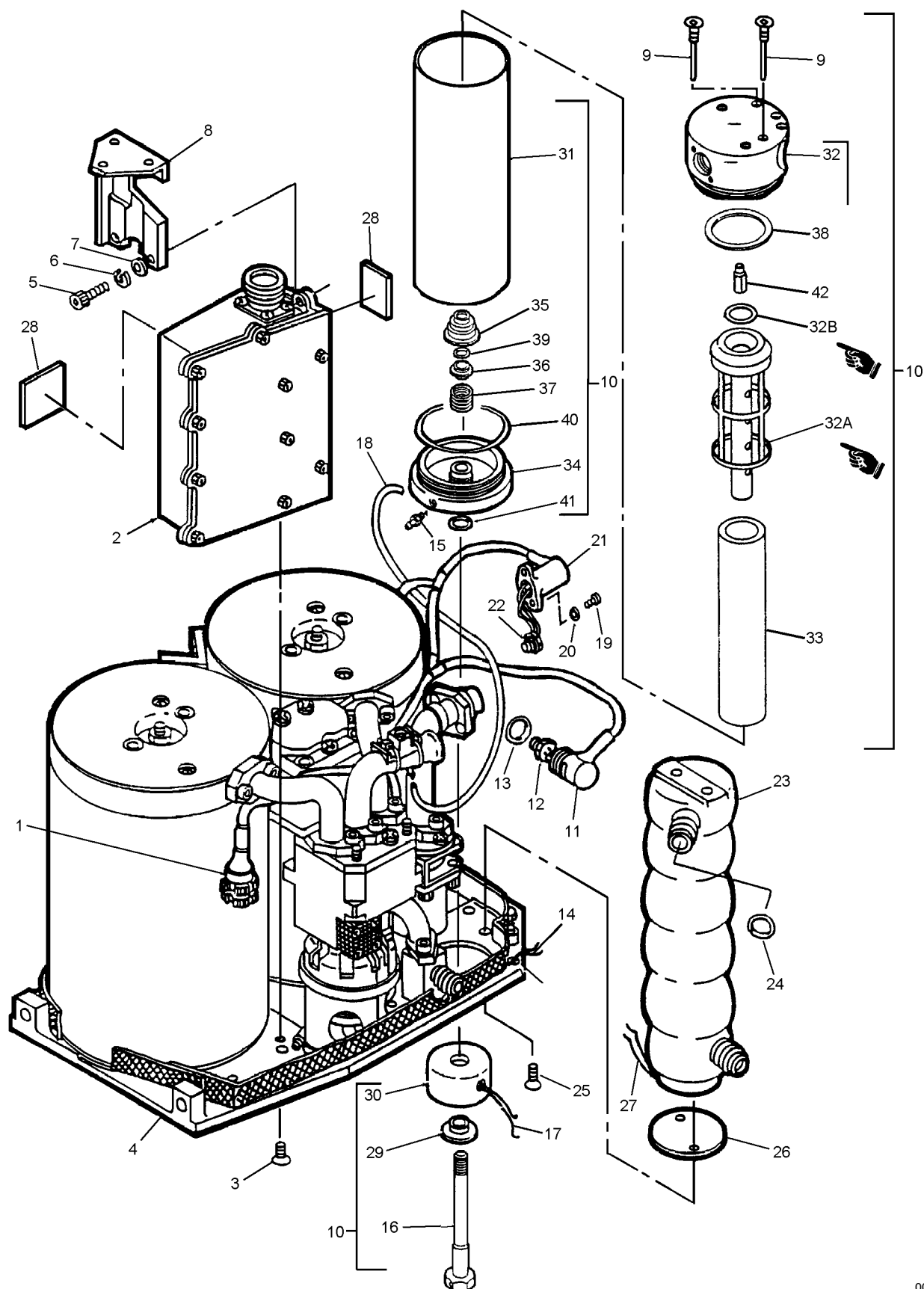


Figure 6-12. Plenum Assembly/Oxygen Fitting Removal/Assembly

006012



00601301

Figure 6-13. Junction Box/Inlet Filter/Heater Assembly Removal/Assembly (Sheet 1 of 2)

- | | |
|--------------------------------|---------------------------|
| 1. SPECIAL CABLE ASSEMBLY | 23. HEATER ASSEMBLY |
| 2. JUNCTION BOX ASSEMBLY | 24. PREFORMED PACKING |
| 3. MACHINE SCREW | 25. MACHINE SCREW |
| 4. MOUNTING PLATE ASSEMBLY | 26. CUSHION DISK |
| 5. SOCKET HEAD CAP SCREW | 27. HEATER ASSEMBLY LEADS |
| 6. SPRING LOCK WASHER | 28. DAMPING PAD |
| 7. FLAT WASHER | 29. HELICAL RETAINER |
| 8. JUNCTION BOX BRACKET | 30. SUPPORT CUT |
| 9. SETSCREW | 31. FILTER HOUSING SLEEVE |
| 10. INLET FILTER ASSEMBLY | 32. INLET FILTER HOUSING |
| 11. CABLE ASSEMBLY EMI COVER | 32A. WATER TRAP |
| 12. THERMAL RESISTOR | 32B. SEAL |
| 13. PREFORMED PACKING | 33. FILTER ELEMENT TUBE |
| 14. MACHINE SCREW | 34. FILTER MOUNT BASE |
| 15. TUBE FITTING | 35. HELICAL RETAINER |
| 16. SPECIAL BOLT | 36. HELICAL RETAINER |
| 17. LOCK WIRE | 37. HELICAL SPRING |
| 18. NONMETALLIC TUBING | 38. PREFORMED PACKING |
| 19. SOCKET HEAD CAP SCREW | 39. PREFORMED PACKING |
| 20. LOCK WASHER | 40. PREFORMED PACKING |
| 21. CABLE ASSEMBLY SWITCH COVE | 41. PREFORMED PACKING |
| 22. THERMOSTATIC SWITCH | 42. THREADED ADAPTER |

Figure 6-13. Junction Box/Inlet Filter/Heater Assembly Removal/Assembly (Sheet 2 of 2)

6-61. INLET FILTER ASSEMBLY DISASSEMBLY.

To disassemble the Inlet Filter Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Remove threaded adapter (42) from inlet filter housing (32).

2. Remove nonmetallic tubing (18) from tube fitting (15).

NOTE

The orifice and screen, once removed and discarded, are obsolete and will not be replaced during assembly.

3. Remove tube fitting (15) from filter mount base (34).

6-62. HEATER ASSEMBLY REMOVAL. To remove the Heater Assembly, proceed as follows:

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Remove socket head cap screw (19), lockwasher (20), cable assembly switch cover (21) and thermostatic switch (22) from heater assembly (23).

2. Remove two setscrews (9) from inlet filter housing (32).

3. Remove two machine screws (25) securing heater assembly (23) to mounting plate assembly (4).

4. Remove three machine screws (12, [figure 6-10](#)) securing mounting plate assembly (1, [figure 6-10](#)) to electrical box (13, [figure 6-10](#)).

5. Remove heater assembly (23) and electrical box (13, [figure 6-10](#)) as a unit, then remove electrical box to expose heater leads (27).

6. Carefully cut insulation sleeving and disconnect two heater assembly leads (27) and remove heater assembly (23).

7. Remove and discard preformed packing (24).

6-63. SPECIAL CABLE ASSEMBLY REMOVAL. To remove the Special Cable Assembly, proceed as follows:

NOTE

Index numbers refer to figure 6-14 unless otherwise noted.

1. Remove two socket head cap screws (5, figure 6-13), spring lockwashers (6, figure 6-13), flat washers (7, figure 6-13), and junction box bracket (8, figure 6-13) from junction box assembly (2).
2. Disconnect special cable assembly electrical connector J2 (1) from junction box assembly electrical connector (2).
3. Carefully cut and remove electrical tiedown strap (3).
4. Carefully cut insulation sleeving and disconnect rotary valve electrical connector (4) from cable assembly electrical connector (5).
5. Remove two setscrews (6) from top of inlet filter assembly (7), and remove cable assembly EMI cover (8) and thermal resistor (9).
6. Remove and discard preformed packing (10).
7. Remove two socket head cap screws (11), lockwashers (12), switch cover (13) and thermostatic switch (14) from heater assembly (15).
8. Remove three socket head cap screws (18), lockwashers (19), flat washers (20), and remove electrical box cover (21) from electrical box (22).
9. Carefully cut insulation sleeving and disconnect two electrical leads (16) from heater assembly (15).
10. Remove four socket head cap screws (23) flat washers (24), and electrical retaining plate (25) from electrical box (22).
11. Carefully cut and remove electrical tiedown straps (26) and (27), and remove special cable assembly (28).

6-64. MOLECULAR SIEVE BED ASSEMBLY REMOVAL. To remove the Molecular Sieve Bed Assembly, proceed as follows:

NOTE

Index numbers refer to figure 6-14 unless otherwise noted.

1. Remove two machine screws (29) and lockwashers (30) securing L-bracket (31) to molecular sieve bed assemblies (32) and (33).
2. Remove four socket head cap screws (34), lockwashers (35), and flat washers (36) securing metallic tube assembly (37) and metallic bent tube assembly (38) to molecular sieve bed assemblies (32) and (33).
3. Remove and discard preformed packing (39) and (40).
4. Remove eight machine screws (41) and carefully remove molecular sieve bed assemblies (32) and (33) from concentrator.
5. Remove and discard preformed packing (42) and (43).

6-65. CLEANING OF DISASSEMBLED PARTS.

6-66. To clean the disassembled oxygen concentrator component parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Acetone	O-A-51
As Required	Bag, Plastic	MIL-B-117 (CAGE 81349)
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Toluene	TT-T-548 NIIN 00-281-2002
As Required	Xylene	TT-X-916 (CAGE 81348)

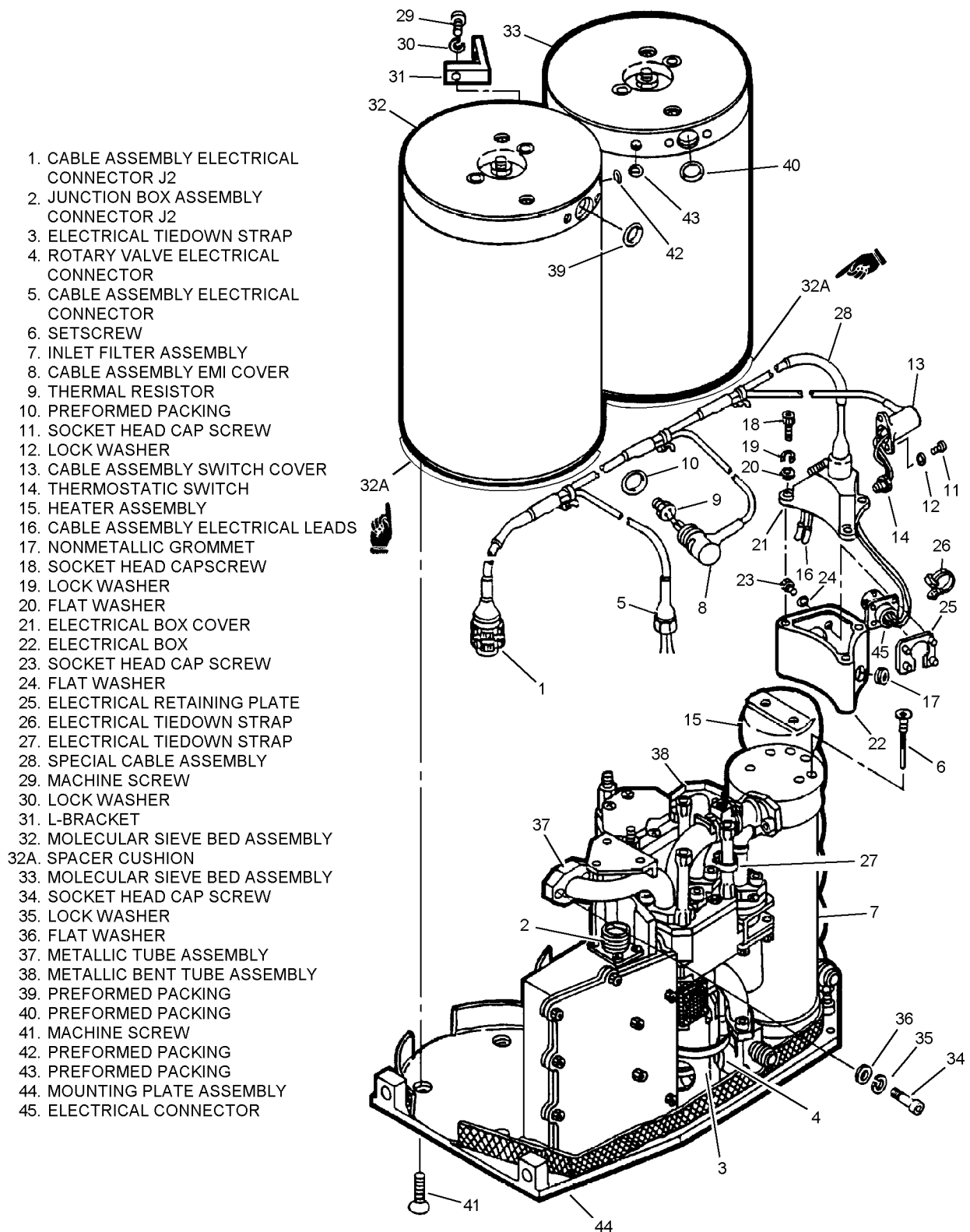


Figure 6-14. Special Cable Assembly/Sieve Bed Removal/Assembly

006014

Support Equipment Required

Quantity	Description	Reference Number
1	Goggles or Face Shield	NIIN 00-052-3776



When working with oxygen, make certain that clothing, tubing, fittings, and equipment are free of oil, grease, fuel, hydraulic fluid, or any combustible liquid. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

- 1. Clean all electrical contact points by lightly fur-bishing with a fine abrasive material.
- 2. Clean all metallic parts using procedures outlined in NAVAIR 13-1-6.4-1. Blow dry with oil-free water-pumped nitrogen.



Do not attempt to clean any silicone rubber or elastic parts that have become contami-nated with oil or grease. All such parts shall be replaced.

- 3. Prior to installation, wash all silicone rubber parts in distilled water and blow dry with oil-free water-pumped nitrogen.
- 4. Cleaned parts shall be sealed in plastic bags for storage. Also, bag all complete assemblies that are not immediately returned to service.



Use goggles for eye protection when using xylene or toluene when performing step 5.

- 5. Remove old RTV adhesive by applying small amounts of xylene or toluene.

- 6. Remove old sealant from screws using small amounts of acetone.

6-67. INSPECTION OF DISASSEMBLED PARTS.

6-68. Carefully inspect the disassembled oxygen con-centrator for cleanliness, irregular wear, and good condition using the following procedures and guidance.

- 1. Inspect all electrical wiring for cuts, breaks in in-sulation covering, and clean contact points; replace as necessary.
- 2. Inspect all screws for nicks, burrs, rounded screw-driver slots and other obvious damage; replace as neces-sary.
- 3. Inspect all metallic surfaces for corrosion, cleanli-ness, and other obvious damage; clean or replace parts as necessary.
- 4. Inspect molecular sieve bed assemblies for securi-ty of self-sealing machine screws, nicks in sealing sur-faces, stripped threads in screw holes, and cleanliness; replace or repair as necessary.
- 5. Inspect electrical receptacle connectors for bent pins, corrosion, and cleanliness; clean or replace as nec-essary.
- 6. Inspect shroud assemblies for cuts, tears, and oth-er obvious damage, replace as necessary.
- 7. Inspect rotary valve assembly, pressure reducer assembly, inlet filter assembly, heater assembly, plenum assembly, special cable assembly, junction box assem-bly and electrical box, for good condition; replace if necessary.
- 8. Inspect stabilizer and mounting plates for corro-sion, breaks, and good condition; clean, repair or re-place as necessary.
- 9. Inspect check valve assemblies for smooth seating surfaces, cleanliness, bent or distorted springs, and free-dom of operation; replace as necessary.

6-69. REPAIR.

6-70. Repair of the oxygen concentrator is limited to patching of the shroud assembly, replacing defective component parts, minor repairs (small dents, scratches, abrasions, nicks, etc.) of tubing. To make minor re-pairs, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive, Clear	DC3145
As Required	Lacquer, Cellulose, Jet Black	MIL-L-7178
As Required	Cloth, Laminated, Vinyl-Nylon	MIL-C-43006E NIIN 00-926-1585
As Required	Tape, Hook	MIL-F-21840 NIIN 00-454-9063
As Required	Tape, Pile	MIL-F-21840 NIIN 00-978-0113
As Required	Wool, Aluminum	—

1. Tubing assemblies with minor dents not causing flow restriction are considered serviceable. Small scratches, abrasions, and nicks can be smoothed with a burnishing tool or aluminum wool.

2. To avoid burnishing the same area more than once, each burnished area shall be identified by a painted band. Color bands shall be black in color and shall cover an area not less than 2 inches nor more than 3 inches in length.

3. Tubing nicked, abraded, or scratched in an area previously identified as burnished shall be condemned.

4. To repair the shroud assembly, proceed as follows:

a. Cut a piece of shroud material to the desired length and width.

b. Clean the affected area of shroud assembly.

c. Apply adhesive in accordance with container directions and apply patch to shroud area.

d. Replace damaged hook or pile tape as necessary.

6-71. ASSEMBLY.**NOTE**

Equivalent tools or materials may be used as long as the integrity of the test, procedures or equipment is not compromised.

Coat all preformed packings with Krytox 240 AC prior to installing unless otherwise noted.

6-72. MOLECULAR SIEVE BED ASSEMBLY INSTALLATION. To install the Molecular Sieve Bed Assemblies, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealant	Loctite 262
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
8	Bolt, Cut-off	Fabricate IAW figure 6-14A from AN-5-24 NIIN 00-151-0917

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to figure 6-14 unless otherwise noted.

1. Apply Krytox 240 AC to preformed packings (42) and (43) and install in molecular sieve bed assemblies (32) and (33).

2. Turn molecular sieve bed assemblies (32) and (33) upside down.

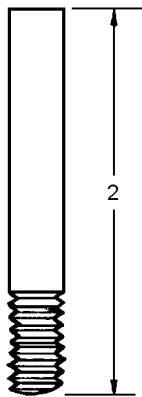
a. Install 8 cut-off bolts (figure 6-14A) into sieve beds (32) and (33).

b. Align two spacer cushions (32A) with 8 cut-off bolts and install spacer cushions (32A) onto sieve beds (32) and (33).

c. Align mounting plate assembly (44) with 8 cut-off bolts and install mounting plate assembly (44) onto sieve beds (32) and (33).

NOTE

Remove one cut-off bolt at a time when securing mounting plate assembly (44) to sieve bed assemblies (32) and (33) with machine screws (41), to prevent two spacer cushions (32A) from becoming misaligned with sieve beds (32) and (33).



BOLT AFTER CUTTING

Figure 6-14A. Cut-off Bolt

006014a

Materials Required (Cont)

Quantity	Description	Reference Number
As Required	Sleeving, Insulation	M23053/5-104-0
As Required	Sleeving, Insulation	M23053/5-106-0
As Required	Sleeving, Insulation	M23053/5-109-0
As Required	Solder	QQ-S-571, Comp SN63
As Required	Tape, Anti-seize	MIL-T-27730A

Support Equipment Required

Quantity	Description	Reference Number
1	Brush	—
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002
1	Pliers, Cutters, Full Flush	Maximum Excelta, #119E1
1	Pliers, Flat Nose	Utica, #20-41/2 GCS
1	Pliers, Round Nose, Extra Fine	Utica, #U431
1	Soldering Iron	—
1	Stripper, Solid Wire	Ideal #45-125
1	Stripper, Standard Wire	Ideal #45-121
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

3. Apply sealant compound to first two threads of eight machine screws (41). Secure molecular sieve bed assemblies (32) and (33) to mounting plate assembly (44). Torque machine screws 130 to 135 in-lb.

4. Apply Krytox 240 AC to preformed packing (39) and (40) and install in molecular sieve beds (32) and (33).

5. Install metallic tube assembly (37) and metallic bent tube assembly (38) in molecular sieve bed assemblies (32) and (33) and secure with four socket head cap screws (34), lockwashers (35), and flat washers (36). Torque socket head cap screws to 2.0 to 2.2 in-lb.

6. Apply sealing compound (Loctite 222) to first two threads of two machine screws (29).

7. Install L-bracket (31) on molecular sieve bed assemblies (32) and (33) and secure with two machine screws (29) and lockwashers (30).

6-73. SPECIAL CABLE ASSEMBLY INSTALLATION. To install the Special Cable Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive Sealant, Silicone, RTV 3145	GS-06F-12702 NIIN 00-145-0020
As Required	Alcohol, Isopropyl	TT-I-735 NIIN 00-655-8366
As Required	Compound Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Sleeving, Insulation	M23053/5-103-0

NOTE

Index numbers refer to figure 6-14 unless otherwise noted.

1. Place special cable assembly (28) on concentrator assembly as shown.

2. Connect cable assembly electrical connector J2 (1) to junction box assembly connector J2 (2).

NOTE

Index numbers in this paragraph only refer to figure 6-13.

3. Secure junction box assembly (2) to junction box bracket (8) with two sockethead cap screws (5), spring lockwashers (6), and flat washers (7). Torque socket head cap screws to 5.0 to 7.5 in-lb.

NOTE

Index numbers refer to [figure 6-14](#) unless otherwise noted.

4. (Reference [figure 6-15](#) for wiring connection.) Slide three insulation sleeves (P/N M23053/5-103-0) 2.0 to 2.5 inches long over three individual leads RED, WHT and YEL located at cable assembly electrical connector (5). Slide back from lead connectors until ready to heat shrink.

5. Slide insulation sleeving (P/N M23053/5-106-0) 1.7 to 2.25 inches long over all three leads RED, WHT and YEL located at cable assembly electrical connector (5). Slide back from lead connectors until ready to heat shrink.

6. Slide insulation sleeving (P/N M23053/5-109-0) 2.0 to 2.25 inches long over entire cable assembly electrical connector (5). Slide back from connector until ready to heat shrink.

7. Mate the three connectors on the RED (male), WHT (female), and YEL (female) wires of the cable assembly electrical connector (5) to the RED (female), WHT (male), and YEL (male) wire connectors of the rotary valve electrical connector (4).

WARNING

The heat gun can generate extreme heat that can cause severe burns.

8. Slide insulating sleeving (P/N M23053/5-103-0), previously installed, over each of three leads and secure by shrinking in place with heat gun.

9. Slide insulation sleeving (P/N M23053/5-106-0), previously installed, over all three leads and secure by shrinking in place.

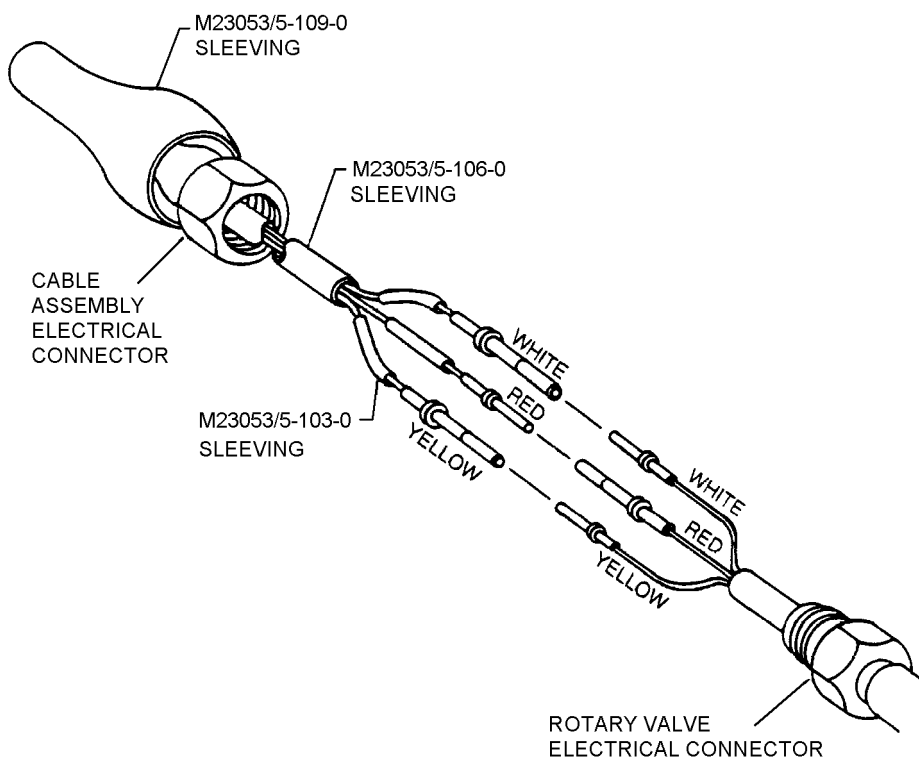


Figure 6-15. Wiring Connection for Cable Assembly Electrical Connector to Rotary Valve Electrical Connector

006015

NAVAIR 13-1-6.4-3

10. Connect rotary valve electrical connector (4) to cable assembly electrical connector (5).

11. Slide insulation sleeving (P/N M23053/5-109-0), previously installed, over both electrical connectors (4) and (5) and secure by shrinking in place.

12. Apply Krytox 240 AC to preformed packing (10) and install on cable assembly EMI cover (8).

13. Wrap threads of thermal resistor (9) with anti-seize tape and install in inlet filter assembly (7). Torque thermal resistor to 60 to 125 in-lb. Cut lead wires on thermal resistor to 0.5 in.

14. Slide insulation sleeving (P/N M23053/5-103-0) over the BLK and WHT wires protruding from cable assembly EMI cover (8). Slide back until connection is made and wires are soldered.

15. Using mechanical hand wire strippers, strip insulation from BLK and WHT wire ends approx. 3/16 in, also strip the two WHT wire leads extending from the thermal resistor (9) approx. 3/16 inch.

16. Tin the exposed BLK and WHT stranded wire ends by heating the stripped ends with the soldering iron and applying solder until solder penetrates to the inner strands of wire, but does not obscure the wire contour of the individual wire strands. The entire stripped end shall be tinned to within $1/16 \pm 1/32$ inch from the end of the insulation.

17. (Reference [figure 6-16](#) for wiring connection.) With round nose pliers, form J-hooks on the end of all four wires.

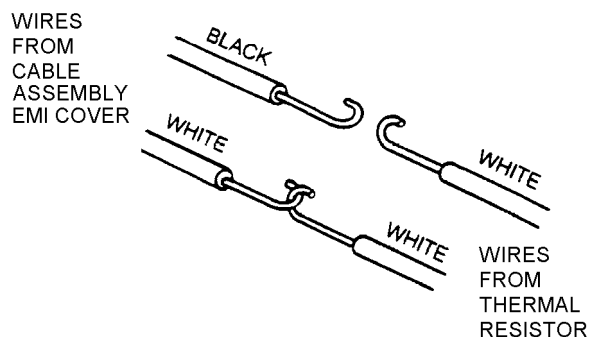


Figure 6-16. Cable Assembly EMI Cover Wires

006016

18. Interlock the BLK and WHT wire J-hooks with the two WHT wire J-hooks. If necessary, use flat nose pliers and gently press J-hooks together for a tight connection.

19. After connection is made, examine for excess wire extending from J-hooks and carefully trim any excess with wire cutters.

20. Position connection so that the soldering iron tip can be placed beneath. Heat the J-hook connection and apply solder until the J-hook to J-hook soldering operation is complete. Repeat process with the second connection.

21. Clean flux residue from the soldered connections with alcohol and brush.

WARNING

The heat gun can generate extreme heat that can cause severe burns.

22. Apply silicone adhesive sealant to the soldered connections to seal. Pull insulation sleeving over the soldered connections and, using heat gun, shrink insulation sleeving in place.

23. Install cable assembly EMI cover (8) in inlet filter assembly (7).

24. Install two setscrews (6) in top of inlet filter assembly (7) Torque setscrews to 2.0 to 2.2 in-lb.

25. Apply sealant compound to first two threads of thermostatic switch (14) and install in heater assembly (15).

26. Slide insulation sleeving (P/N M23053/5-104-0) over all three BLU, BRN and VIO wires protruding from switch cover (13). Slide sleeving back from wire ends until connection is made.

27. Strip wire insulation approx. 1/4 inch from all three wires with mechanical hand wire strippers.

28. Tin the exposed ends of all three wire ends by heating the stripped ends with the soldering iron and applying solder until solder penetrates to the inner strands of wire, but does not obscure the wire contour of the individual wire strands. The entire stripped end shall be tinned to within $1/16 \pm 1/32$ inch from the end of the insulation.

29. (See [figure 6-17](#) for the soldering connection.) Form a J-hook on the end of all three wires using round nose pliers.

30. Slide the J-hooks from switch cover wires through the eyelets in the leads of thermostatic switch (14) as follows: BRN to S1-1, VIO to S1-2 and BLU to S1-3. If necessary, use flat nose pliers and gently press J-hook to eyelet for a tight connection.

31. After connection is made, examine for excess wire extending from J-hooks and trim any excess with wire cutters.

32. Position connection so that the soldering iron tip can be placed underneath. Heat the connection and apply solder until the J-hook to lead eyelet soldering process is complete. Repeat for the second and third connections.

33. Clean flux residue from soldered connections with alcohol and a brush.

WARNING

The heat gun can generate extreme heat that can cause severe burns.

34. Slide insulation sleeving over the soldered connections and, using heat gun, shrink insulation sleeving in place. Seal by applying silicone adhesive sealant to soldered connection.

35. Install switch cover (13) with two socket head cap screws (11) and lockwashers (12). Torque 4.0 to 4.5 in-lb.

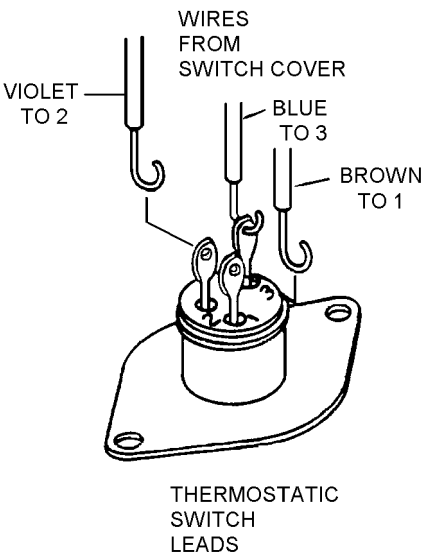
36. Slide insulation sleeving (P/N M23053/5-104-0) over two electrical leads (16) protruding from the electrical box cover (21). Slide sleeving away from leads until connection is completed.

37. Mate the two female electrical leads (16) to heater assembly (15) male leads that protrude from nonmetallic grommet (17).

WARNING

The heat gun can generate extreme heat that can cause severe burns.

38. Slide insulation sleeving over connection and, using the heat gun, shrink insulation sleeving in place.



006017

Figure 6-17. Switch Cover Wires

39. Install J1 electrical connector (45) and secure with four socket head cap screws (23), flat washers (24), and electrical retaining plate (25) to electrical box (22). Torque socket head cap screws to 20 to 25 in-lb.

40. Loop wires inside electrical box (22) and secure with electrical tiedown strap (26).

41. Install electrical box cover (21) on electrical box (22) and secure with three socket head cap screws (18), lockwashers (19), and flat washers (20). Torque socket head cap screws to 20 to 25 in-lb.

42. Secure special cable assembly to concentrator assembly with electrical tiedown straps (3) and (27).

6-74. HEATER ASSEMBLY INSTALLATION. To install the Heater Assembly, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
As Required	Adhesive Sealant, Silicone, RTV 3145	GS-06F-12702 NIIN 00-145-0020

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Materials Required (Cont)

Quantity	Description	Reference Number
As Required	Alcohol, Isopropyl	TT-I-735 NIIN 00-655-8366
As Required	Compound Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Sleeving, Insulation	M23053/5-104-0
As Required	Solder	QQ-S-571, Comp SN63

Support Equipment Required

Quantity	Description	Reference Number
1	Brush	—
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002
1	Pliers, Cutters, Full Flush	Maximum Excelta, #119E1
1	Pliers, Flat Nose	Utica, #20-41/2 GCS
1	Pliers, Round Nose, Extra Fine	Utica, #U431
1	Soldering Iron	—
1	Stripper, Solid Wire	Ideal #45-125
1	Stripper, Standard Wire	Ideal #45-121
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Install heater assembly (23) ensuring leads (27) are installed through nonmetallic grommet (17, [figure 6-14](#)).

2. Secure cushion disk (26) and heater assembly (23) to mounting plate (4) with two screws (25).

3. Slide insulation sleeving over two heater assembly leads (27). Slide sleeving back from leads until connection is made.

4. Mate the two female electrical leads (16, [figure 6-14](#)) to heater assembly (27) male leads.

WARNING

The heat gun can generate extreme heat that can cause severe burns.

5. Using heat gun, shrink insulation sleeving in place.

6. Apply sealant compound to first two threads of thermostatic switch (22) and install in heater assembly (23).

7. Slide insulation sleeving over all three BLU, BRN and VIO wires protruding from switch cover (21). Slide sleeving back from wire ends until connection is made.

8. Strip wire insulation approx. 1/4 in. from all three wires with mechanical hand wire strippers.

9. Tin exposed ends of all three wire ends by heating the stripped ends with the soldering iron and applying solder until solder penetrates to the inner strands of wire, but does not obscure the wire contour of the individual wire strands. The entire stripped end shall be tinned to within 1/16 ± 1/32 inch from the end of the insulation.

10. (See [figure 6-17](#) for soldering connection.) Form a J-hook on the end of all three wires using round nose pliers.

11. Slide the J-hooks from switch cover wires through the eyelets in the leads of thermostatic switch (22) as follows: BRN to S1-1, VIO to S1-2 and BLU to S1-3. If necessary, use flat nose pliers and gently press J-hook to eyelet for a tight connection.

12. After connection is made, examine for excess wire extending from J-hooks and trim any excess with wire cutters.

13. Position the connection so that the soldering iron tip can be placed underneath. Heat the connection and apply solder until the J-hook to lead eyelet soldering process is complete. Repeat for the second and third connections.

14. Clean flux residue from soldered connections with alcohol and a brush.

WARNING

The heat gun can generate extreme heat that can cause severe burns.

15. Slide insulation sleeving over the soldered connections and, using heat gun, shrink insulation sleeving in place. Seal by applying silicone adhesive sealant to soldered connection.

16. Install switch cover (21) and secure with two socket head cap screws (19) and lockwashers (20). Torque to 4.0 to 4.5 in-lb.

17. Apply Krytox 240 AC to preformed packing (24) and install on heater assembly (23).

6-75. INLET FILTER ASSEMBLY. To assemble the Inlet Filter Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealant	Loctite 290

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Install tube fitting (15) in filter mount base (34). Torque tube fitting to 1.5 to 2.5 in-lb.

2. Apply sealant compound (Loctite 290) to threads of threaded adapter (42), and install threaded adapter on inlet filter housing (32). Torque threaded adapter to 140 to 160 in-lb.

3. Install nonmetallic tubing (18) on tube fitting (15).

6-76. INLET FILTER ASSEMBLY INSTALLATION. To install the Inlet Filter Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive Sealant, Silicone, RTV 3145	GS-06F-12702 NIIN 00-145-0020
As Required	Compound, Sealant	Loctite 290
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Sleeving, Insulation	M23053/5-103-0
As Required	Solder	QQ-S-571, Comp SN63

Support Equipment Required

Quantity	Description	Reference Number
1	Brush	—
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002
1	Pliers, Cutters, Full Flush	Maximum Excelta, #119E1
1	Pliers, Flat Nose	Utica, #20-41/2 GCS
1	Pliers, Round Nose, Extra Fine	Utica, #U431
1	Soldering Iron	—
1	Stripper, Solid Wire	Ideal #45-125
1	Stripper, Standard Wire	Ideal #45-121
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

- Index numbers refer to [figure 6-13](#) unless otherwise noted.
1. Apply Krytox 240 AC to preformed packing (24) and install on heater assembly (23).
 2. Install inlet filter housing (32) on heater assembly (23) and secure with two set screws (9), torque screws to 2.0 to 2.2 in-lb.
 3. Wrap threads of thermal resistor (12) with anti-seize tape and install in inlet filter housing (32). Torque thermal resistor to 60 to 125 in-lb. Cut lead wires on thermal resistor to 0.5 in.
 4. Slide insulation sleeving over BLK and WHT wires protruding from cable assembly EMI cover (11). Slide back until connection is made and wires are soldered.
 5. Using mechanical hand wire strippers, strip insulation from BLK and WHT wire ends approximately 3/16 inch, also strip the two WHT wire leads extending from the thermal resistor (12) approximately 3/16 inch.
 6. Tin the exposed BLK and WHT stranded wire ends by heating the stripped ends with the soldering iron and applying solder until solder penetrates to the inner strands of wire, but does not obscure the wire contour of the individual wire strands. The entire stripped end shall be tinned to within $1/16 \pm 1/32$ inch from the end of the insulation.
 7. (Refer to [figure 6-16](#) for soldering connection.) With round nose pliers, form J-hooks on the end of all four wires.
 8. Interlock the BLK and WHT wire J-hooks with the two WHT wire J-hooks. If necessary, use flat nose pliers and gently press J-hooks together for a tight connection.
 9. After connection is made, examine for excess wire extending from J-hooks and carefully trim any excess with wire cutters.
 10. Position connection so that the soldering iron tip can be placed beneath. Heat the J-hook connection and apply solder until the J-hook to J-hook soldering operation is complete. Repeat process with the second connection.
 11. Clean flux residue from the soldered connections with alcohol and brush.

WARNING

- The heat gun can generate extreme heat that can cause severe burns.
12. Pull insulation sleeving over the soldered connections. Using heat gun, shrink insulation sleeving in place. Seal by applying silicone adhesive sealant to soldered connections.
 13. Apply Krytox 240 AC to preformed packing (13) and install on cable assembly EMI cover (11).
 14. Install cable assembly EMI cover (11) in inlet filter housing (32).
 15. Install two setscrews (9) in top of inlet filter assembly (10), torque screws to 2.0 to 2.2 in-lb.

6-77. FILTER ELEMENT TUBE INSTALLATION.
To install the Filter Element Tube, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Lockwire	MS20995C20

Support Equipment Required

Quantity	Description	Reference Number
1	Tube Pliers, Inlet Filter Drain	3309311-1 (CAGE 99251)

NOTE

- Index numbers refer to [figure 6-13](#) unless otherwise noted.
1. Apply Krytox 240 AC to preformed packings (38), (39), (40), and (41) and install.
 - 1A. Install filter element tube (33) and seat (32B) into water trap (32A).

2. Install filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), helical retainers (35 and 36), and helical spring (37) on filter mount base (35).

3. Push down on top of water trap (32A) and while holding against the spring tension, tilt water trap and filter housing sleeve (31) toward the back of the concentrator and into position beneath inlet filter housing (32).

4. When the ID of water trap (32A) is aligned with the locator on the top of inlet filter housing (32), release water trap and allow spring tension to seat water trap on inlet filter housing.

5. Install filter mount base (34) and filter housing sleeve (31) and all contents on inlet filter housing (32).

6. Install special bolt (16), helical retainer (29) and support cup (30) as an assembly, from bottom of concentrator assembly.



Nuts are to be lock-wired in such a way that if they were to be loosened, the lock-wire would tighten.

7. Connect lockwire (17) and tie fasteners in accordance with MS33540.

8. Using inlet filter drain tube pliers (P/N 3309311-1) install nonmetallic tube (18) onto tube fitting (15) and rotary valve vent tube hose barb.

6-78. JUNCTION BOX ASSEMBLY INSTALLATION. To install the Junction Box Assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise noted.

1. Install two damping pads (28) on junction box assembly (2).

2. Secure junction box assembly (2) to mounting plate assembly (4) with four machine screws (3). Torque machine screws to 20 to 25 in-lb.

3. Connect cable assembly electrical connector J2 (1) to the electrical connector of the junction box assembly (2).

4. Secure junction box assembly (2) to junction box bracket (8) with two sockethead cap screws (5), spring lockwashers (6), and flat washers (7). Torque socket head cap screws to 5.0 to 7.5 in-lb.

6-79. OXYGEN FITTING INSTALLATION. To install the Oxygen Fitting, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Apply Krytox 240 AC to preformed packing (6) and install in oxygen fitting (5).

2. Apply sealant compound to first two threads of three screws (18).

3. Install oxygen fitting (5) on mounting plate assembly (19) and secure with three screws (18). Torque screws to 20 to 25 in-lb.

4. Install metallic tube assembly (4) in oxygen fitting (5) and secure with two socket head cap screws (1), lockwashers (2), and flat washers (3). Torque socket head cap screws to 4.0 to 5.0 in-lb.

6-80. CHECK VALVE ASSEMBLY INSTALLATION. To install Check Valve Assembly, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
As Required	Compound, Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Install two check valves (25).
2. Apply Krytox 240 AC to four preformed packings (26) and (27) and install in plenum (24).
3. Apply Krytox 240 AC to two preformed packings (13) and install in molecular sieve bed assemblies (10) and (11).
4. Install manifold (23) and secure to plenum (24) with three machine screws (21), and lockwashers (22).
5. Apply sealant compound to first two threads of two special bolts (20). Install and secure special bolts through manifold (23) into plenum (24).
6. Slide two sleeve bushings (8) into molecular sieve bed assemblies (10) and (11). This procedure will secure plenum assembly (9) to molecular sieve bed assemblies (10) and (11).
7. Install two spring tension clips (7) on sleeve bushings (8).

6-81. PLENUM ASSEMBLY. To assemble the Plenum Assembly, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
As Required	Compound, Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

Support Equipment Required		
Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Install two check valves assemblies (25) in plenum (24).
2. Apply Krytox 240 AC to preformed packings (36) and (37), two preformed packings (26) and two preformed packings (27).
3. Install preformed packing (36) and preformed packing (37) in plenum cover (31).
4. Install two preformed packings (27) and two preformed packings (26) in plenum (24).
5. Install fluid filtering disk (34) and fluid filter element (35) on plenum cover (31) and secure with machine screw (32) and lockwasher (33).
6. Install plenum cover (31), with assembled parts, on plenum (24) and secure with three machine screws (30). Torque screws to 4.0 to 5.0 in-lb.
7. Apply Krytox 240 AC to two machine screws (29) and two preformed packings (12).
8. Install two machine screws (29) and two preformed packings (12) in manifold (23). Torque machine screws to 21 to 25 in-lb.
9. Install manifold (23) and secure to plenum (24) with three machine screws (21), and lockwashers (22).

10. Apply sealant compound to first two threads of two special bolts (20). Install and secure special bolts through manifold (23) into plenum (24).

11. Apply sealant compound to first two threads of electrical-mechanical post (28). Install post (28) in plenum (24).

6-82. PLENUM ASSEMBLY INSTALLATION. To install the Plenum Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-12](#) unless otherwise noted.

1. Apply Krytox 240 AC to preformed packing (17), two preformed packings (12) and two preformed packings (13).

2. Install preformed packing (17) and two preformed packings (12) in plenum assembly (9). Install two preformed packings (13) in molecular sieve bed assemblies (10) and (11).

3. Install plenum assembly (9) on metallic tube assembly (4) and secure with two socket head cap screws (14), lockwashers (15), and flat washers (16). Torque socket head cap screws to 4.0 to 4.5 in-lb.

4. Apply Krytox 240 AC to preformed packing (6) and install in oxygen fitting (5).

5. Install sleeve bushings (8) into plenum assembly (9).

6. Carefully install the plenum assembly (9) with metallic tube assembly, attached, in oxygen fitting (5).

7. Slide two sleeve bushings (8) into molecular sieve bed assemblies (10) and (11). This procedure will secure plenum assembly (9) to molecular sieve bed assemblies (10) and (11).

8. Install two spring tension clips (7) on sleeve bushings (8).

9. Secure metallic tube assembly (4) to oxygen fitting (5) with two socket head cap screws (1), lockwashers (2), and flat washers (3). Torque socket head cap screws to 4.0 to 4.5 in-lb.

6-83. ROTARY VALVE ASSEMBLY INSTALLATION. To install the Rotary Valve Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound Sealant	Loctite 222
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Sleeving, Insulation	M23053/5-103-0
As Required	Sleeving, Insulation	M23053/5-106-0
As Required	Sleeving, Insulation	M23053/5-109-0

Support Equipment Required

Quantity	Description	Reference Number
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to figure 6-11 unless otherwise noted.

1. Position motor mount halves (35) as shown. Ensure electrical connector (29) is placed through access hole in motor mount half. Install motor mount halves (35) on rotary valve assembly (5) and loop clamp (36), secure with hose clamps (33) and (34).

2. Apply Krytox 240 AC to preformed packing (6) and two preformed packings (26), install in rotary valve assembly (5).

3. Apply Krytox 240 AC to two preformed packings (25) and install in molecular sieve bed assemblies (24).

4. Secure metallic bent tube assembly (20) to rotary valve assembly (5) with two socket head cap screws (17), lockwashers (18), and flat washers (19). Torque socket head cap screws to 2.0 to 2.2 in-lb.

5. Repeat steps 3 and 4 for the other metallic tube assembly (27).

6. Apply Krytox 240 AC to preformed packing (15) and install in the inlet filter assembly (14).

7. Apply Krytox 240 AC to preformed packing (40).

8. Install preformed packing (40) and pressure reducer assembly (39) on rotary valve assembly (5).

9. Place rotary valve assembly (5), with pressure reducer assembly installed, in mounting position and secure ground lug (45) to mounting plate assembly (32) with socket head cap screw (42), lockwasher (43), and flat washer (44). Torque socket head cap screw to 10.0 to 12.0 in-lb.

10. Apply sealant compound to first two threads of two machine screws (31). Secure rotary valve assembly (5) to mounting plate assembly (32) with two machine screws (31). Torque screws to 75 to 80 in-lb.

NOTE

If new rotary valve assembly P/N 1657420-1 is being installed new metallic tube (rotary valve vent tube) P/N 1657867-1 (8, figure 6-20) must be installed when performing step 11.

11. Install metallic tube assembly (4) on rotary valve assembly (5) and secure with two socket head cap screws (1), lockwashers (2), and flat washers (3). Torque screws to 2.0 to 2.2 in-lb.

NOTE

If new rotary valve assembly P/N 1657420-1 is installed, perform step 1A.

11A. Using inlet filter drain pliers (P/N 3309311-1), install one end of non-metallic tube (10, figure 6-22) to inboard hose barb on metallic tube (4). Route other end of non-metallic tube down and between rotary valve and sieve beds and install non-metallic tube on hose barb located on bottom corner of rotary valve assembly.

12. Install metallic bent tube assembly (20) in molecular sieve bed assembly (24) and secure with two socket head cap screws (21), lockwashers (22), and flat washers (23). Torque socket head cap screws to 2.0 to 2.2 in-lb.

13. Repeat steps 11 and 12 for the other metallic tube assembly (27).

14. Install metallic bent tube assembly (10) to inlet filter assembly (14) with two socket head cap screws (11), lockwashers (12), and flat washers (13). Torque screws to 2.0 to 2.2 in-lb.

15. (Refer to figure 6-15 for wiring connections.) Slide three insulation sleeves (P/N M23053/5-103-0) 2.0 to 2.5 inches long over three individual leads RED, WHT and YEL located at cable assembly electrical connector (30). Slide back from lead connectors until ready to heat shrink.

16. Slide insulation sleeving (P/N M23053/5-106-0) 1.7 to 2.25 inches long over all three leads RED, WHT and YEL located at cable assembly electrical connector (30). Slide back from lead connectors until ready to heat shrink.

17. Slide insulation sleeving (P/N M23053/5-109-0) 2.0 to 2.25 inches long over entire cable assembly electrical connector (30). Slide back from connector until ready to heat shrink.

18. Mate the three connectors on the RED (male), WHT (female), and YEL (female) wires of the cable assembly electrical connector (30) to the RED (female), WHT (male), and YEL (male) wire connectors of the rotary valve electrical connector (29).

WARNING

The heat gun can generate extreme heat that can cause severe burns.

19. Slide insulating sleeving (P/N M23053/5-103-0), previously installed, over each of three leads and secure by shrinking in place with heat gun.

20. Slide insulation sleeving (P/N M23053/5-106-0), previously installed, over all three leads and secure by shrinking in place.

21. Connect rotary valve electrical connector (29) to cable assembly electrical connector (30).

22. Slide insulation sleeving (P/N M23053/5-109-0), previously installed, over cable assembly electrical connectors (30) and rotary valve electrical connector (29) and secure by shrinking in place.

23. Secure electrical connectors (29) and (30) with electrical tiedown strap (28).

6-84. PRESSURE REDUCER ASSEMBLY INSTALLATION. To install the Pressure Reducer Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to figure 6-11 unless otherwise noted.

1. Apply Krytox 240 AC to preformed packings (15) and (16) and install in inlet filter assembly (14) and pressure reducer assembly (39).

2. Position metallic bent tube assembly (10) and secure to pressure reducer assembly (39) with two socket-head cap screws (7), spring lockwashers (8), and flat washers (9). Torque screws to 4.0 to 4.5 in-lb.

3. Install hex nut (47) and electrical-mechanical post (40).

4. Apply Krytox 240 AC to preformed packing (40).

5. Install preformed packing (40) and pressure reducer assembly (39) on rotary valve assembly (5), ensure metallic bent tube assembly is inserted in inlet filter assembly (14), and secure with two socket head cap screws (37) and lockwashers (38). Torque screws to 20 to 25 in-lb.

6. Secure metallic bent tube assembly (10) to inlet filter assembly (14) with two socket head cap screws (11), lockwashers (12), and flat washers (13). Torque screws to 2.0 to 2.2 in-lb.

6-85. SHROUD ASSEMBLY INSTALLATION. To install the Shroud Assembly, proceed as follows:

1. Install concentrator shroud on mounting plate.
2. Install concentrator shroud on stabilizer plate.
3. Install mounting plate (paragraph 6-86).
4. Install stabilizer plate (paragraph 6-87).
5. Install and secure concentrator shroud (34, figure 6-9).

6-86. MOUNTING PLATE INSTALLATION. To install the Mounting Plate, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound Sealant	Loctite 222
As Required	Lockwire	MS20995C20

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to figure 6-10 unless otherwise noted.

1. Apply sealant compound to first two threads of machine screw (26). Install strap assembly (28) and secure with machine screw (26) and flat washer (27). Torque machine screw to 10.0 to 12.5 in-lb.

2. Apply sealant compound to first two threads of machine screw (23). Install strap assembly (25) and secure with machine screw (23) and flat washer (24). Torque machine screw to 10.0 to 12.5 in-lb.

3. Install machine screw (19) and flat washer (20). Torque machine screw to 10.0 to 12.5 in-lb.

4. Align holes and install ring spacers (22), cushion disk (18) concentrator shroud (21), and mounting plate assembly (1).

5. Secure ground terminal (17) to mounting plate assembly (1) with socket head cap screw (14), lockwasher (15), and flat washer (16). Torque socket head cap screw to 10.0 to 12.5 in-lb.

6. Apply sealant compound to first two threads of three machine screws (12). Ensure shroud is not pinched between mounting plate and any components and secure mounting plate assembly (1) to electrical box (13) with three machine screws (12). Torque machine screws to 20 to 25 in-lb.

7. Apply sealant compound to first two threads of two machine screws (10). Secure mounting plate assembly (1) to heater assembly (11) with two machine screws (10). Torque machine screws to 75 to 80 in-lb.

8. Apply sealant compound to first two threads of three machine screws (8). Secure mounting plate assembly (1) to oxygen fitting (9) with three machine screws (8). Torque machine screws to 20 to 25 in-lb.

9. Apply sealant compound to first two threads of two machine screws (6). Secure mounting plate assembly (1) to rotary valve assembly (7) with two machine screws (6). Torque machine screws to 75 to 80 in-lb.

10. Secure mounting plate assembly (1) to junction box assembly (5) with four machine screws (4). Torque machine screws to 20 to 25 in-lb.

11. Apply sealant compound to first two threads of eight machine screws (2). Secure mounting plate assembly (1) to molecular sieve bed assemblies (3) with eight machine screws (2). Torque machine screws to 130 to 135 in-lb.

12. Turn concentrator over so it is sitting on mounting plate assembly (1).

13. Install and secure lockwire to machine screw (19) and special bolt (16, [figure 6-13](#)) in accordance with MS33540.

14. Install and secure concentrator shroud (3, [figure 6-9](#)).

6-87. STABILIZER PLATE INSTALLATION. To install the Stabilizer Plate, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound Sealant	Loctite 222
As Required	Lockwire	MS20995C20
As Required	Setscrew	MS51963-30
As Required	Setscrew	MS51963-55
As Required	Setscrew	MS51964-71

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 300 in-lb	TE25A (CAGE 55719) NIIN 00-776-1841

NOTE

Index numbers refer to [figure 6-9](#) unless otherwise noted.

1. Temporarily install three setscrews (MS51963-30), to retain spacers (10) on junction box bracket (9); setscrew (MS51963-55), to retain flat washers (17) on vent tube support (16); four setscrews (MS51963-55), to retain flat washers (21) on electrical-mechanical posts (20); and two setscrews (MS51964-71), to retain heater spacers (28), nonmetallic washers (29), and flat washers (30) on heater assembly (27).

2. Remove from peg board and install spacers (10) on junction box bracket (9). Repeat for shims (31) on plenum assembly (13), flat washers (17) on vent tube support (16), flat washers (21) on electrical-mechanical posts (20), heater spacers (28), nonmetallic washers (29) and flat washers (30) on heater assembly (27).

3. Remove from peg board and install flat washers (33) and secure with electrical-mechanical posts (32) on inlet filter assembly (24).

4. Install concentrator shroud (34) and stabilizer plate (5) on concentrator.

5. Apply sealant compound to first two threads of four machine screws (4) and secure stabilizer plate (5) to molecular sieve bed assemblies (6). Torque screws to 75 to 80 in-lb.

6. Apply sealant compound to first two threads of two hexagon cap screws (25). Remove two setscrews (MS51964-71) aligning stabilizer plate (5), heater spacers (28), nonmetallic washers (29), and flat washers (30) with heater assembly (27) and secure with two hexagon cap screws (25) and flat washers (26). Torque hexagon cap screws to 75 to 80 in-lb. Using lockwire, wire tie fasteners in accordance with MS33540.

7. Install two hex nuts (22) and flat washers (23) securing stabilizer plate (5) to inlet filter assembly (24). Torque nuts to 27.5 to 30 in-lb. Using lockwire, wire tie fasteners in accordance with MS33540.

8. Apply sealant compound to first two threads of four machine screws (18). Remove four setscrews (MS51963-55) aligning stabilizer plate (5), flat washers (21), electrical-mechanical posts (20) and secure with four machine screws (18) and flat washers (19). Torque machine screws to 10.0 to 12.5 in-lb.

9. Apply sealant compound to first two threads of machine screw (14). Remove setscrew (MS51963-55) aligning stabilizer plate (5), flat washers (17), vent tube support (16) and secure with machine screw (14) and flat washer (15). Torque machine screw to 10.0 to 12.5 in-lb.



Do not over torque, damage to electrical-mechanical posts may occur.

10. Install three hex nuts (11) and flat washers (12) securing stabilizer plate (5) to plenum assembly (13). Torque hex nuts to 4.5 to 5.0 in-lb. Using lockwire, wire tie fasteners in accordance with MS33540.

11. Apply sealant compound to first two threads of machine screws (7). Remove three setscrews (MS51963-30) aligning stabilizer plate (5), spacers (10), junction box bracket (9) and secure with three machine screws (7) and flat washers (8). Torque machine screws to 5.0 to 7.5 in-lb.

12. Install webbing strap (2) and secure with cotter pins (1).

13. Install and secure concentrator shroud (3).

6-88. SCHEDULED MAINTENANCE.

6-89. REPLACEMENT OF INLET FILTER TUBE ELEMENT. Prior to testing or repair of the GGU-12/A

oxygen concentrator or after 400 flight hours of service life, remove and replace the Inlet Filter Tube Element. At this time check the part number of the inlet filter assembly (it will be marked on the housing). If the part number is 1647710-1, the part is obsolete and it will be updated to the 1647710-2 configuration by performing the following:

Materials Required		
Quantity	Description	Reference Number
As Required	Lockwire	MS20995C20
As Required	Krytox 240 AC	NIIN 00-961-8995 (CAGE 73925)

NOTE

The inlet filter tube element shall be replaced with an RFI replacement.

Equivalent tools may be used as long as the integrity of the test, procedure or equipment is not compromised.

Index numbers refer to [figure 6-13](#) unless otherwise specified.

1. Cut lockwire (17) and remove special bolt (16) from bottom of concentrator assembly.

2. Remove outer helical retainer (29) and support cup (30).

3. Grasp filter housing sleeve (31) and push down to separate filter housing sleeve from inlet filter housing (32) and expose water trap (32A) with seat (32B), and filter element (33) attached.

4. To allow for removal of water trap (32A) and disassembly of the filter housing sleeve (31) from the filter base (34), insert a small bladed screwdriver above metal on the top of water trap (32A). Push down on the top of water trap (32A) and while holding against the spring tension, tilt water trap and filter housing sleeve toward the front of the concentrator and out from under inlet filter housing (32).

5. Remove filter mount base (34) with filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), and inlet filter housing (32) with all attached parts.

6. Remove filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), helical retainers (35 and 36), and helical spring (37) from filter mount base (34).

7. Remove and discard seat (32B) and filter element tube (33) from water trap (32A).

NOTE

Water trap (32A) and seat (32B) are new items and must be ordered and installed during reassembly of the inlet filter assembly.

- 8. Remove and discard preformed packings (38), (39), (40), and (41).
- 9. If inlet filter assembly housing (32) is marked P/N 1647710-2, proceed to next step. If the P/N is 1647710-1 and/or it has been determined it is necessary to make the modifications discussed in [paragraph 6-18](#), refer to [paragraph 6-90](#).
- 10. Ensure the helical retainer (36), helical spring (37), and special bolt (16) are the -2 configuration parts.
- 11. Apply Krytox 240 AC to preformed packings (38), (39), (40), and (41), and install.
- 12. Install filter element tube (33) and seat (32B) into water trap (32A).
- 13. Install filter housing sleeve (31), water trap (32A) with seat (32B) and filter element tube (33), helical retainers (35 and 36), and helical spring (37) on filter mount base (35).
- 14. Push down on top of water trap (32A) and while holding against the spring tension, tilt water trap and filter housing sleeve (31) toward the back of the concentrator and into position beneath inlet filter housing (32).
- 15. When the ID of water trap (32A) is aligned with the locator on the top of inlet filter housing (32), release water trap and allow spring tension to seat water trap on inlet filter housing.
- 16. Install filter mount base (34), filter housing sleeve (31), and inlet filter housing (32).
- 17. Install special bolt (16), helical retainer (29) and support cup (30) as an assembly, from bottom of concentrator assembly.



Nuts are to be lock-wired in such a way that if they were to loosen the lockwire would tighten.

- 18. Connect lockwire (17) and tie fasteners in accordance with MS33540.

6-90. Inlet Filter Assembly Modification.

Materials Required

Quantity	Description	Reference Number
As Required	Bolt, Special	167715-2
As Required	Lacquer, Black	MIL-L-7178
As Required	Retainer, Helical	1647707-1
As Required	Spring, Helical	1643196-1

NOTE

Index numbers refer to [figure 6-13](#) unless otherwise specified.

- 1. Remove non-metallic tubing (18) from tube adapter (43).
- 2. Remove straight tube adapter (43), orifice (44), and screen (45) from filter mount base (34). Discard orifice and screen.
- 3. If special bolt (16), helical retainer (36), and helical spring (37) need to be modified, proceed to next step. If these parts are already the replacement or modified parts, skip to [step 6](#).
- 4. Tin plate special bolt (16), helical retainer (36), and helical spring (37) in accordance with MIL-T-10727C, Type I to 0.0002 to 0.0004 inch thick. Accomplishment of this changes them to the -2 configuration of the inlet filter assembly. After tinning, special bolt (16) becomes P/N 1647715-8, helical retainer becomes P/N 1647707-2, and helical spring becomes P/N 1643196-2.
- 5. Indicate accomplishment of modification by marking inlet filter housing (32) of the inlet filter assembly with P/N 1647710-2 and the GGU-12/A oxygen concentrator by painting the special bolt (16) with black lacquer as shown in [figure 6-3](#).
- 6. Install straight tube adapter (43) in filter mount base (34). Torque straight tube adapter to 1.5 to 2.5 in-lb.
- 7. Continue with inlet filter tube element replacement, [paragraph 6-89](#), [step 8](#).

Section 6-5. Illustrated Parts Breakdown

6-91. GENERAL.

Litton Systems, Inc., formerly Clifton Precision (CAGE 99251). ■

6-92. This section lists and illustrates the assemblies and detail parts of the OEAS Oxygen Concentrator, Type GGU-12A, P/N 3261077-0101, manufactured by

6-93. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

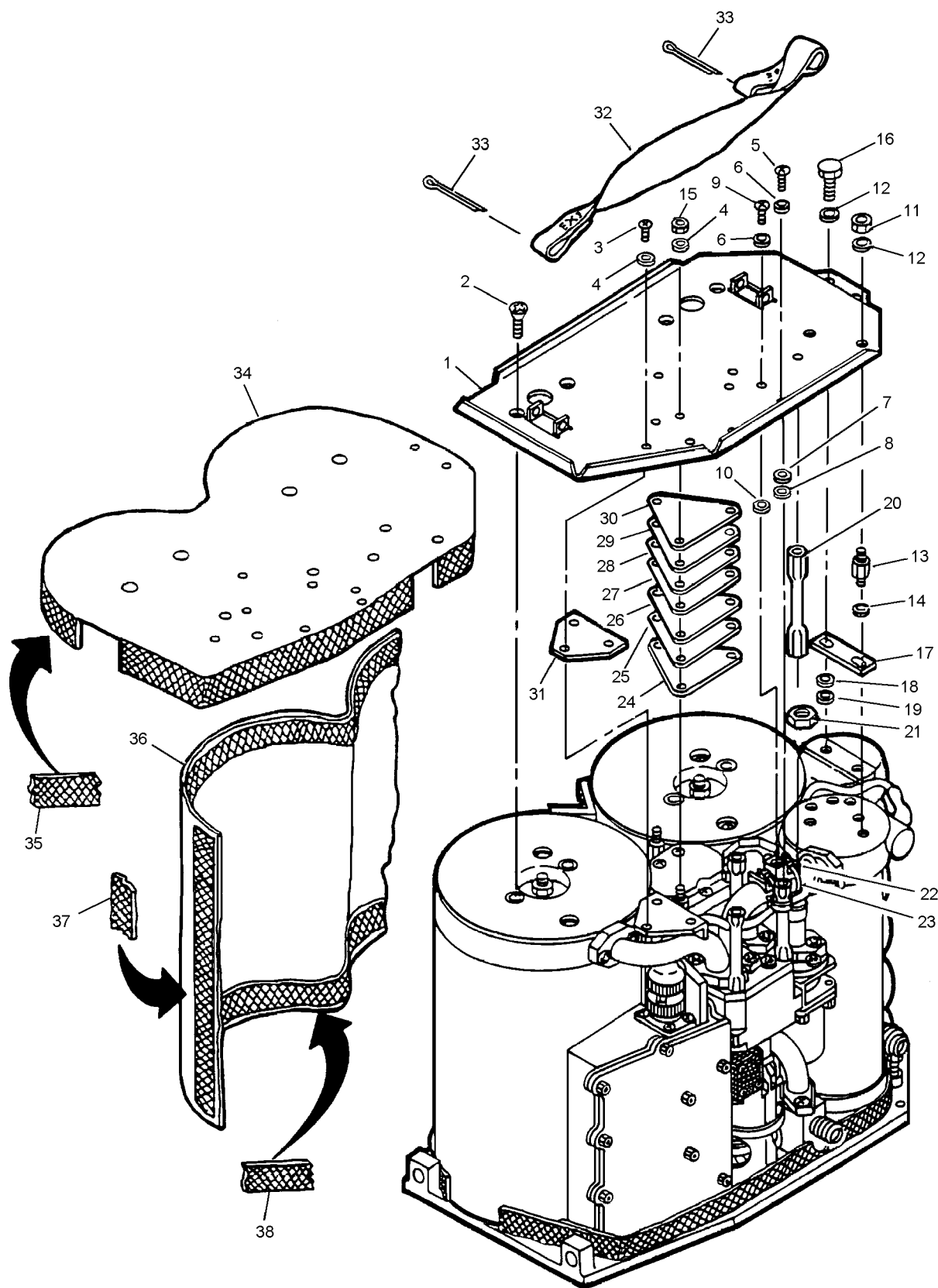


Figure 6-18. Stabilizer Plate/Shroud

006018

Figure and Index Number	Part Number	Description							Units Per Assembly	Usable On Code
		1	2	3	4	5	6	7		
6-18	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR							REF	
		SIEVE (GGU-12/A)								
	1647840-1	. CONCENTRATOR ASSEMBLY							REF	
-1	1647852-1	. . PLATE, Stabilizer							1	
		(ATTACHING PARTS)								
-2	MS51960-83	. . SCREW, Machine							4	
-3	MS51957-30	. . SCREW, Machine							3	
-4	AN960C6	. . WASHER, Flat							6	
-5	MS51957-63	. . SCREW, Machine							4	
-6	NAS620C10L	. . WASHER, Flat							5	
-7	AN960C10	. . WASHER, Flat							AR	
-8	AN960C10L	. . WASHER, Flat							AR	
-9	MS51957-60	. . SCREW, Machine							1	
-10	NAS620C10L	. . WASHER, Flat							AR	
-11	NAS1423C4	. . NUT, Plain, Hexagon							2	
-12	NAS620C416L	. . WASHER, Flat							4	
-13	1647877-1	. . POST, Electrical-Mechanical							2	
-14	1603660-279	. . WASHER, Flat							AR	
-15	NAS509-06C	. . NUT, Plain, Hexagon							3	
-16	MS51100-5	. . SCREW, Cap, Hexagon							2	
		---*---								
-17	1648573-1	. . SPACER, Heater							AR	
-18	1603661-112	. . WASHER, Flat							2	
-19	AN960C416	. . WASHER, Flat							2	
-20	1647721-2	. . POST, Electrical-Mechanical							1	
-21	MS35649-204	. . NUT, Plain, Hex							1	
-22	1647878-1	. . SUPPORT, Tube, Vent							1	
-23	MS3367-5-9	. . STRAP, Tiedown, Electrical							2	
-24	1650104-1	. . CUSHION, Plenum							1	
-25	1650103-1	. . SHIM, Plenum							AR	
-26	1650103-2	. . SHIM, Plenum							AR	
-27	1650103-3	. . SHIM, Plenum							AR	
-28	1650103-4	. . SHIM, Plenum							AR	
-29	1650103-5	. . SHIM, Plenum							AR	
-30	1650103-6	. . SHIM, Plenum							AR	
-31	1649957-1	. . SPACER							AR	
-32	NAS1212R10 KK14	. . STRAP, Webbing							1	
-33	MS24665-374	. . PIN, Cotter							2	
-34	1647906-1	. . SHROUD, Concentrator							1	
-35	1631267-1	. . . BELT, Loop							AR	
-36	1647907-1	. . SHROUD, Concentrator							1	
-37	1631267-1	. . . BELT, Loop							AR	
-38	1631266-1	. . . BELT, Hook							AR	

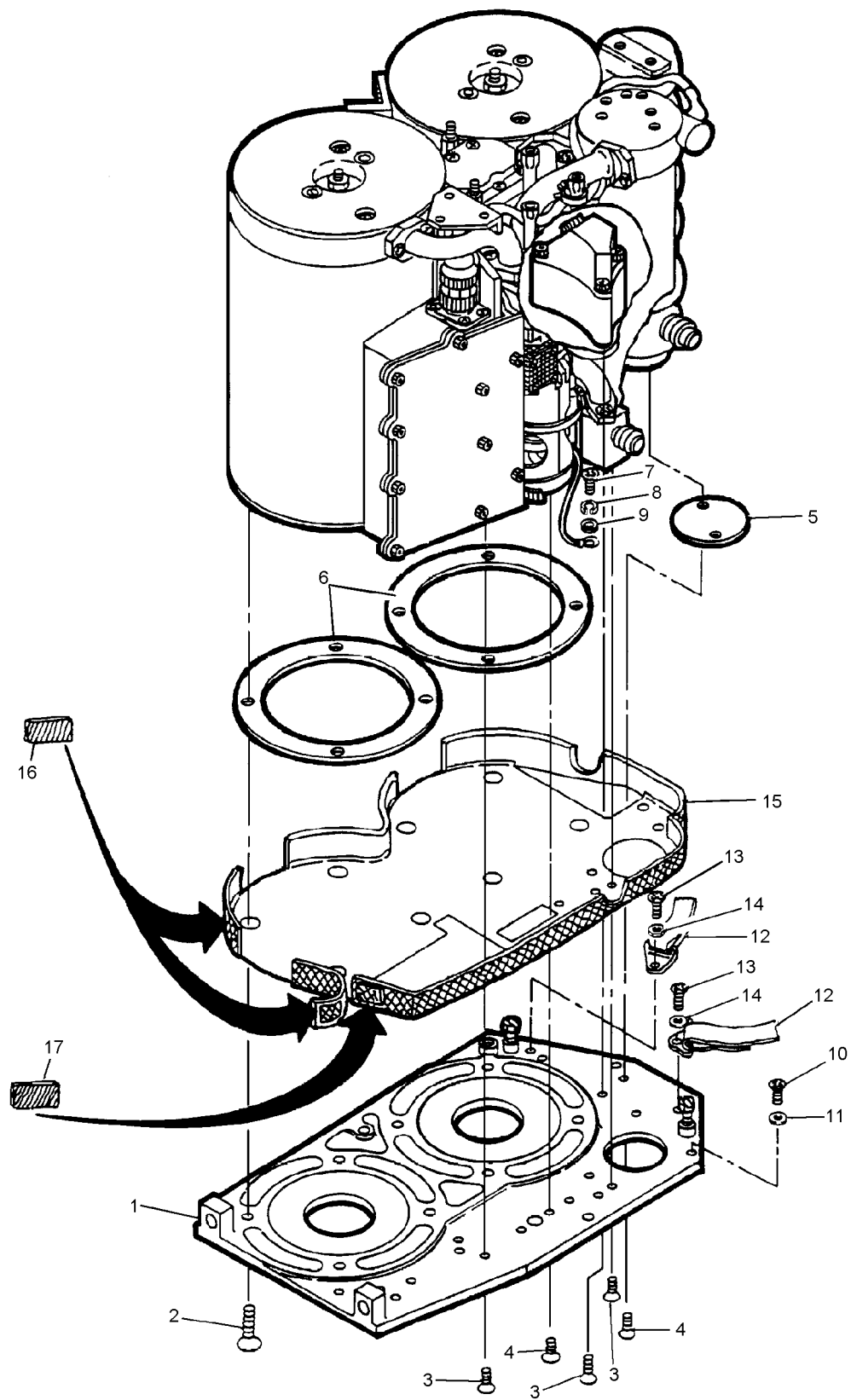


Figure 6-19. Mounting Plate Assembly/Shroud

006019

Figure and Index Number	Part Number	Description							Units Per Assembly	Usable On Code
		1	2	3	4	5	6	7		
6-19	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)							REF	
	1647840-1	. . . . . CONCENTRATOR ASSEMBLY							REF	
-1	1647846-1	. . . . . PLATE ASSEMBLY, Mounting (ATTACHING PARTS)							1	
-2	MS51960-100	. . . . . SCREW, Machine							8	
-3	MS51960-66	. . . . . SCREW, Machine							10	
-4	MS51960-84	. . . . . SCREW, Machine ---*---							4	
-5	1650100-1	. . . . . SPACER, Ring							2	
-6	1650129-1	. . . . . DISK, Cushion							1	
-7	NAS1351C3-5	. . . . . SCREW, Cap, Socket Hd							1	
-8	MS35338-138	. . . . . WASHER, Lock							1	
	MS35338-157	. . . . . WASHER, Lock (Alternate)							1	
-9	AN960C10L	. . . . . WASHER, Flat							1	
-10	MS35276-259	. . . . . SCREW, Machine							1	
-11	NAS620C10L	. . . . . WASHER, Flat							1	
-12	1648123-1	. . . . . STRAP ASSEMBLY (ATTACHING PARTS)							2	
-13	MS51958-60	. . . . . SCREW, Machine							1	
-14	NAS620C10L	. . . . . WASHER, Flat ---*---							1	
-15	1647730-1	. . . . . SHROUD, Concentrator							1	
-16	1631267-1	. . . . . BELT, Loop							AR	
-17	1631266-1	. . . . . BELT, Hook							AR	

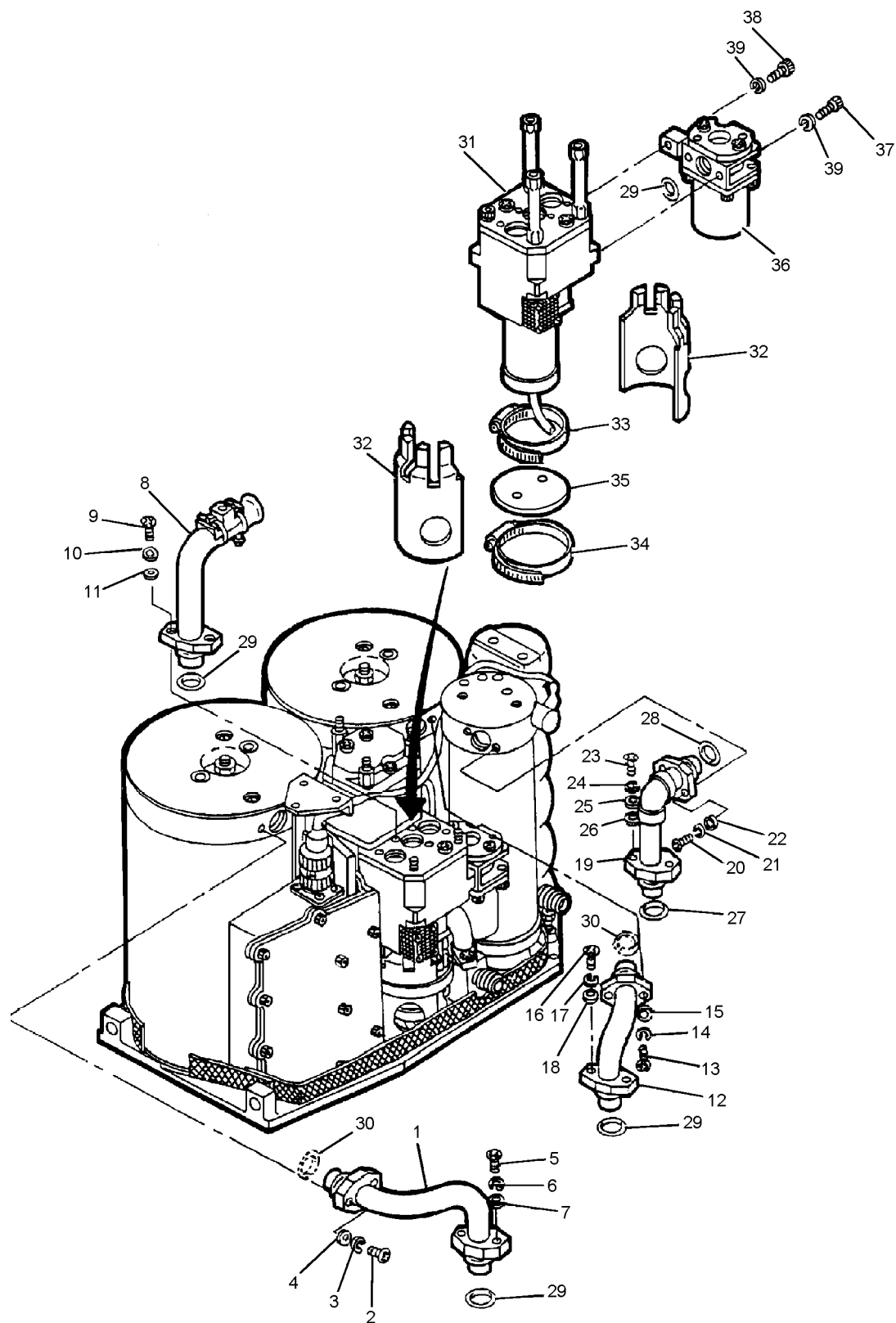


Figure 6-20. Pressure Reducer Assembly/Rotary Valve Assembly

006020

Figure and Index Number	Part Number	Description							Units Per Assembly	Usable On Code
		1	2	3	4	5	6	7		
6-20	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)							REF	
	1647840-1	. . . CONCENTRATOR ASSEMBLY							REF	
-1	1647836-1	. . . TUBE ASSEMBLY, Metallic (ATTACHING PARTS)							1	
-2	NAS1352-04-6P	. . . SCREW, Cap, Socket Hd							2	
-3	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-4	NAS620C4L	. . . WASHER, Flat							2	
-5	NAS1352-04-5P	. . . SCREW, Cap, Socket Hd							2	
-6	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-7	NAS620C4L	. . . WASHER, Flat							2	
		---*---								
-8	1647838-1	. . . TUBE ASSEMBLY, Metallic							1	
	1657867-1	. . . TUBE ASSEMBLY, Metallic (Note)							1	
		(ATTACHING PARTS)								
-9	NAS1352-04-5P	. . . SCREW, Cap, Socket Hd							2	
-10	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-11	NAS620C4L	. . . WASHER, Flat							2	
		---*---								
-12	1647848-1	. . . TUBE ASSEMBLY, Bent, Metallic (ATTACHING PARTS)							1	
-13	NAS1352-04-6P	. . . SCREW, Cap, Socket Hd							2	
-14	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-15	NAS620C4L	. . . WASHER, Flat							2	
-16	NAS1352-04-5P	. . . SCREW, Cap, Socket Hd							2	
-17	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-18	NAS620C4L	. . . WASHER, Flat							2	
		---*---								
-19	1647727-2	. . . TUBE ASSEMBLY, Bent, Metallic (ATTACHING PARTS)							1	
-20	NAS1352-04-6P	. . . SCREW, Cap, Socket Hd							2	
-21	MS35338-135	. . . WASHER, Lock							2	
	MS35338-154	. . . WASHER, Lock (Alternate)							2	
-22	NAS620C4L	. . . WASHER, Flat							2	
-23	NAS1352-04-6P	. . . SCREW, Cap, Socket Hd							2	
-24	MS35338-136	. . . WASHER, Lock, Spring							2	
	MS35338-155	. . . WASHER, Lock, Spring (Alternate)							2	
-25	NAS620C6	. . . WASHER, Flat							2	
-26	NAS620C6L	. . . WASHER, Flat							AR	
		---*---								
-27	1602321-5	. . . PACKING, Preformed							1	

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description							Units Per Assembly	Usable On Code
		1	2	3	4	5	6	7		
6-20-28	1602321-5	.	.	PACKING, Preformed	.	.	.	.	REF	
-29	MS9068-016	.	.	PACKING, Preformed	.	.	.	.	4	
-30	MS9068-016	.	.	PACKING, Preformed	.	.	.	.	REF	
-31	1657420-1	.	.	VALVE ASSEMBLY, Rotary	.	.	.	.	1	
	1647849-1	.	.	VALVE ASSEMBLY, Rotary	.	.	.	.	1	
-32	1649332-1	.	.	MOUNT, Half, Motor, V	.	.	.	.	2	
-33	MS35842-12	.	.	CLAMP, Hose	.	.	.	.	1	
-34	MS35842-13	.	.	CLAMP, Hose	.	.	.	.	1	
-35	1649333-1	.	.	CLAMP, Loop	.	.	.	.	1	
-36	1647701-1	.	.	REDUCER ASSEMBLY, Pressure	.	.	.	.	1	
-37	NAS1352C3-12	.	.	SCREW, Cap, Socket Hd	.	.	.	.	1	
-38	NAS1352C3-8	.	.	SCREW, Cap, Socket Hd	.	.	.	.	1	
-39	MS35338-138	.	.	WASHER, Lock	.	.	.	.	2	
	MS35338-157	.	.	WASHER, Lock (Alternate)	.	.	.	.	2	
Notes:		1. Order rotary valve assembly P/N 1647849-1 until new rotary valve assembly P/N 1657420-1 becomes available in the supply system. Rotary valve assembly P/N 1657420-1 uses tube assembly (8) P/N 1657867-1.								

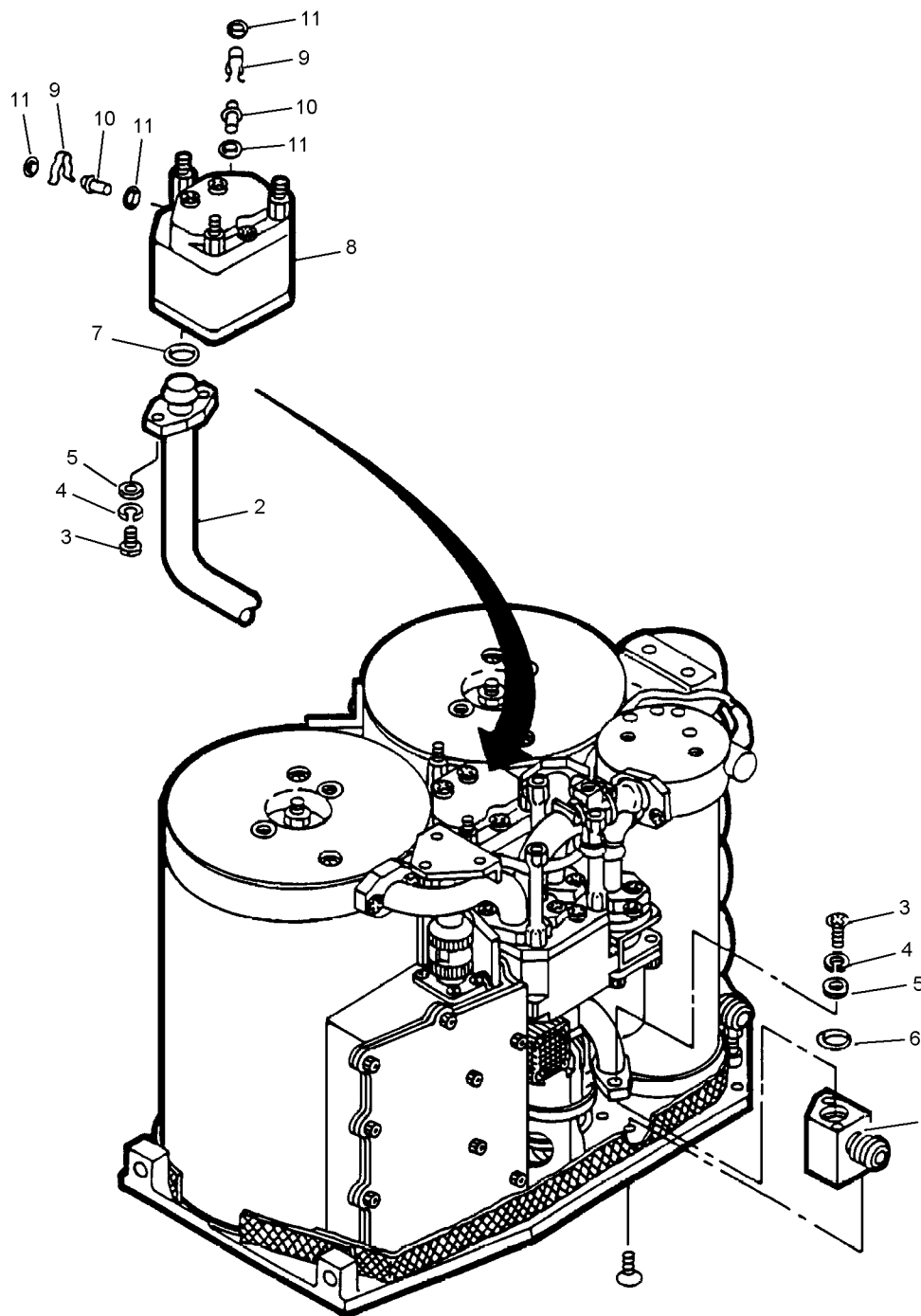


Figure 6-21. Oxygen Fitting/Plenum Assembly

006021

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
6-21	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)	REF	
	1647840-1	. . . . . CONCENTRATOR ASSEMBLY	REF	
-1	1647839-1	. . . . . FITTING, Oxygen	1	
-2	1647837-1	. . . . . TUBE ASSEMBLY, Metallic (ATTACHING PARTS)	1	
-3	NAS1352-04-8P	. . . . . SCREW, Cap, Socket Hd	4	
-4	MS35338-135	. . . . . WASHER, Lock	4	
	MS35338-154	. . . . . WASHER, Lock (Alternate)	4	
-5	NAS620C4L	. . . . . WASHER, Flat ---*---	4	
-6	1602321-5	. . . . . PACKING, Preformed	1	
-7	1602321-5	. . . . . PACKING, Preformed	REF	
-8	1647725-1	. . . . . PLENUM ASSEMBLY	1	
-9	1630839-1	. . . . . CLIP, Spring Tension	2	
-10	1630838-1	. . . . . BUSHING, Sleeve	2	
-11	1602321-51	. . . . . PACKING, Preformed	REF	

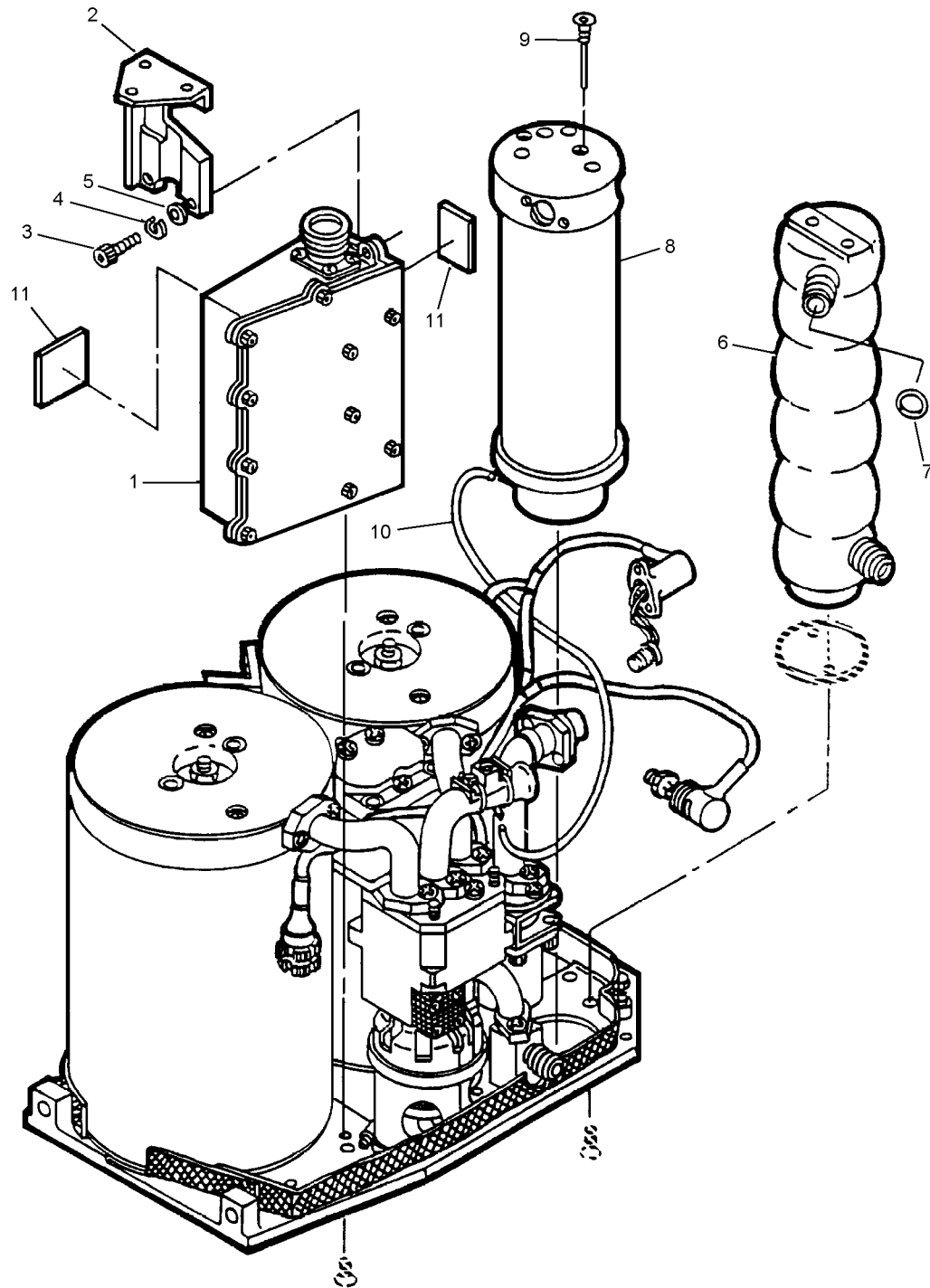


Figure 6-22. Junction Box Assembly/Heater Assembly/Inlet Filter Assembly

006022

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
6-22	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)	REF	
	1647840-1	. . . CONCENTRATOR ASSEMBLY	REF	
-1	1647751-1	. . . JUNCTION BOX ASSEMBLY	1	
-2	1649318-1	. . . BRACKET, Junction Box (ATTACHING PARTS)	1	
-3	NAS1352-06-10P	. . . SCREW, Cap Socket Hd	2	
-4	MS35338-136	. . . WASHER, Lock, Spring	2	
	MS35338-155	. . . WASHER, Lock, Spring (Alternate)	2	
-5	NAS620C6	. . . WASHER, Flat ---*---	1	
-6	1647850-1	. . . HEATER ASSEMBLY	1	
-7	1602321-5	. . . PACKING, Preformed	1	
-8	1653997-1	. . . FILTER ASSEMBLY, Inlet	1	
-9	1631049-1	. . . SETSCREW	4	
-10	TFE1618 (1648106-1)	. . . TUBING, Nonmetallic	AR	
	CHEMFLUOR- AXH00002	. . . TUBING, Plastic (Note 1)	AR	
-11	1648353-2	. . . PAD, Damping	2	
Notes: 1.		Vendor: Read Plastics, 12331 Wilkins Ave., Rockville, MD 20582. Tel: (301) 881-7900. Minimum order 50 feet.		

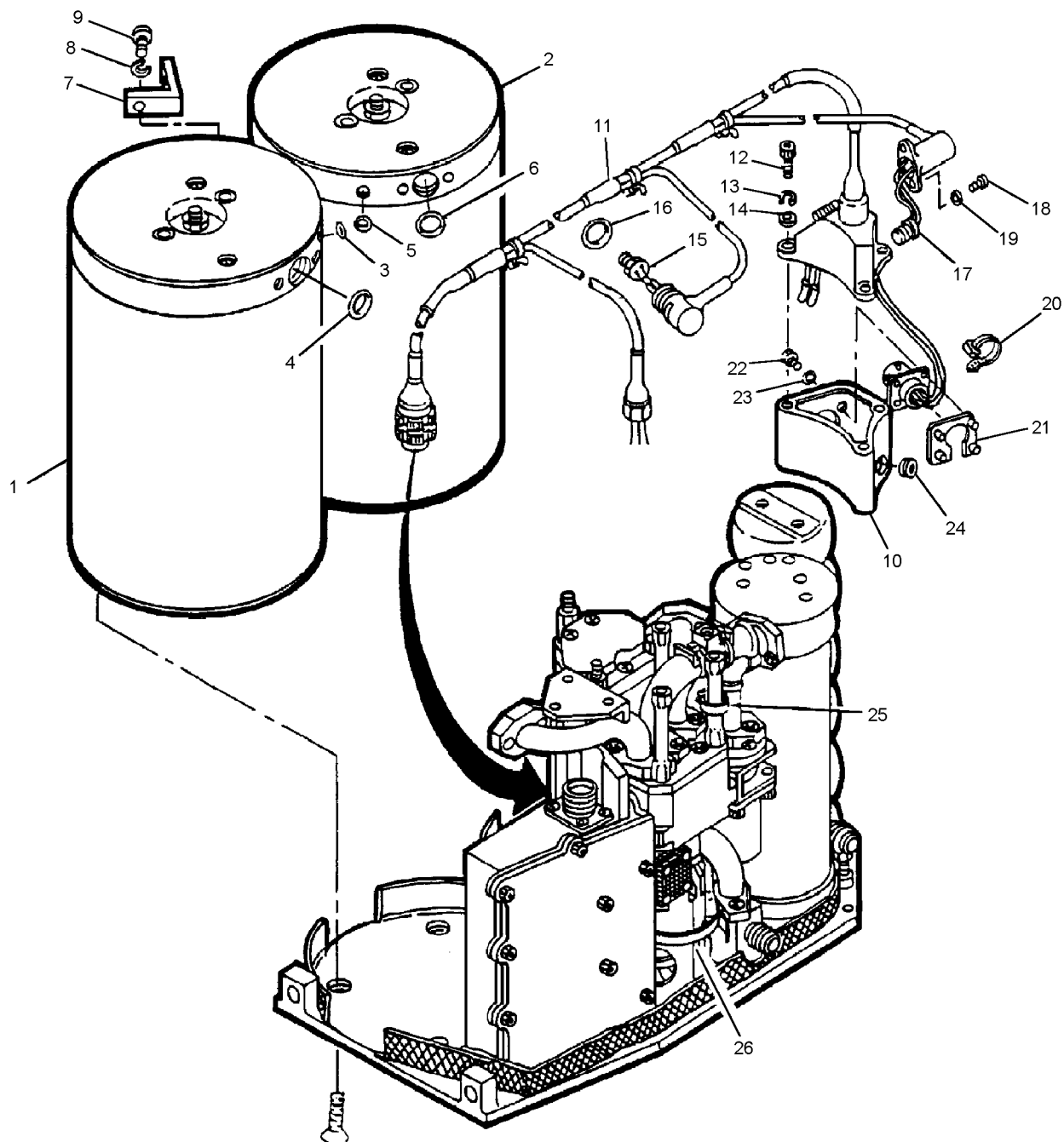


Figure 6-23. Molecular Sieve Bed Assemblies/Special Cable Assembly/Electrical Box

006023

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
6-23	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)	REF	
	1647840-1	. . . . . CONCENTRATOR ASSEMBLY	REF	
	1601374-1	. . . . . BED ASSEMBLIES, Molecular Sieve (Not [E])	1	
	-1 1630850-8	. . . . . BED ASSEMBLY, Molecular Sieve (Not [E])	1	
	-2 1630850-7	. . . . . BED ASSEMBLY, Molecular Sieve (Not [E])	1	
	-3 1602321-51	. . . . . PACKING, Preformed	1	
	-4 1602321-5	. . . . . PACKING, Preformed	1	
	-5 1602321-51	. . . . . PACKING, Preformed	1	
	-6 1602321-5	. . . . . PACKING, Preformed	1	
	-7 1631085-1	. . . . . L-BRACKET (ATTACHING PARTS)	1	
	-8 MS51958-62	. . . . . SCREW, Machine	2	
	-9 MS35338-138	. . . . . WASHER, Lock	2	
	MS35338-157	. . . . . WASHER, Lock (Alternate) ---*---	2	
	-10 1649306-1	. . . . . BOX, Electrical	1	
	-11 1647803-1	. . . . . CABLE ASSEMBLY, Special (ATTACHING PARTS)	1	
	-12 NAS1351C3-8	. . . . . SCREW, Cap, Socket Hd	3	
	-13 MS35338-138	. . . . . WASHER, Lock	3	
	MS35338-157	. . . . . WASHER, Lock (Alternate)	3	
	-14 NAS620C10L	. . . . . WASHER, Flat ---*---	3	
	-15 A1470	. . . . . RESISTOR, Thermal (1647931-1)	1	
	-16 10-00-2085-1285	. . . . . PACKING, Preformed (1649500-23)	1	
	-17 M24236/ 24DRNNH	. . . . . SWITCH, Thermostatic	1	
	-18 NAS1352C04-4	. . . . . SCREW, Cap, Socket Hd	2	
	-19 MS35338-135	. . . . . WASHER, Lock	2	
	MS35338-154	. . . . . WASHER, Lock (Alternate)	2	
	-20 MS3367-5-9	. . . . . STRAP, Tiedown, Electrical	1	
	-21 1648576-1	. . . . . PLATE, Retaining, Electrical	1	
	-22 NAS1352C04-6	. . . . . SCREW, Cap, Socket Hd	4	
	-23 NAS620C4L	. . . . . WASHER, Flat	4	
	-24 MS35489-147	. . . . . GROMMET, Nonmetallic	1	
	-25 MS3367-1-9	. . . . . STRAP, Tiedown, Electrical	1	
	-26 MS3367-7-9	. . . . . STRAP, Tiedown, Electrical	1	
		Notes: 1. Index number 1, P/N 1630850-8, and index number 2, P/N 1630850-7, can no longer be ordered individually; these parts must now be ordered as a set under P/N 1601374-1, NSN 1680-01-511-0071.		

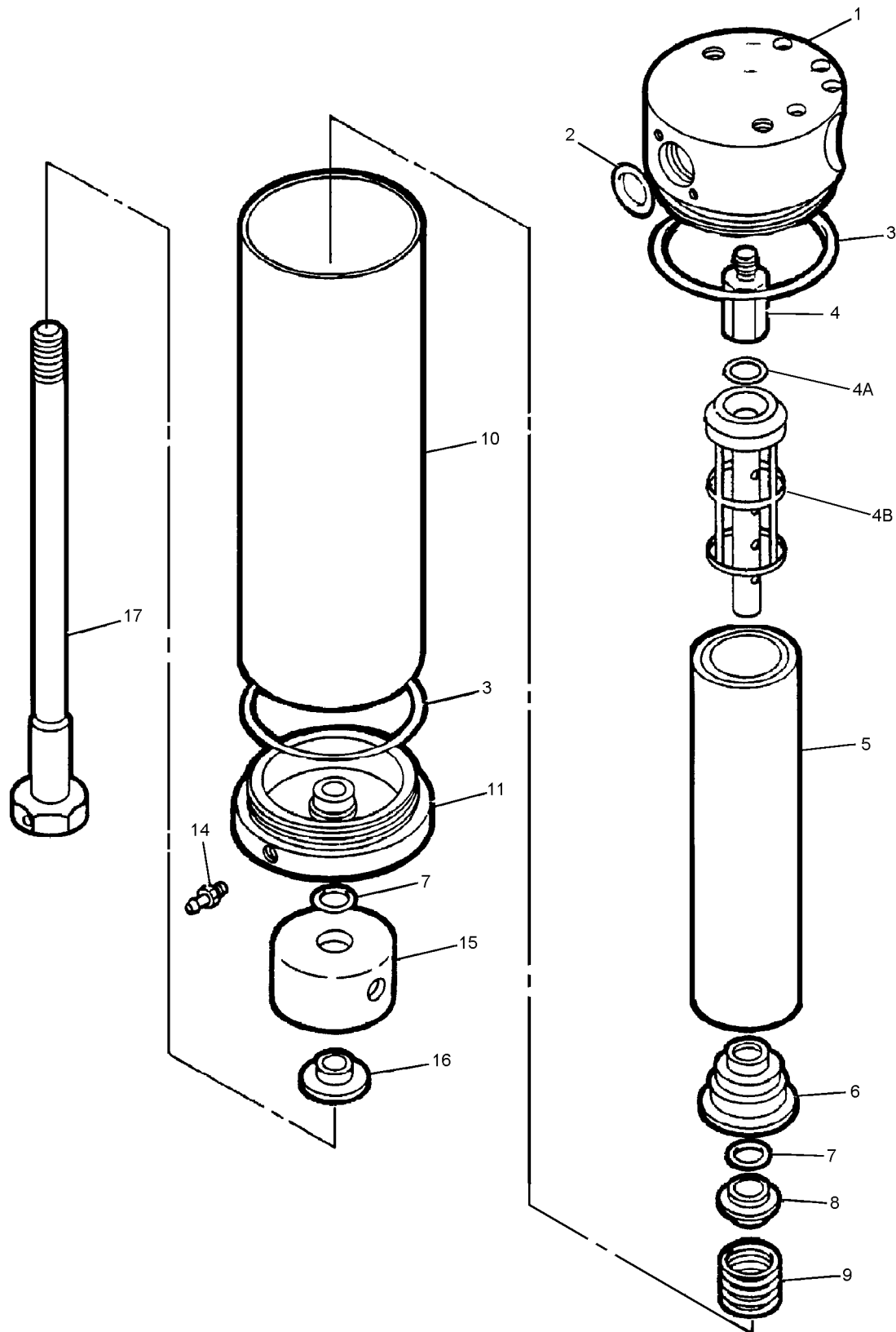


Figure 6-24. Inlet Filter Assembly

006024

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
6-24	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)	REF	
	1647840-1	. CONCENTRATOR ASSEMBLY	REF	
	1653997-1	. . FILTER ASSEMBLY, Inlet	REF	
-1	1647712-1	. . . HOUSING, Filter, Inlet	1	
-2	1602321-5	. . . PACKING, Preformed	1	
-3	MS9068-035	. . . PACKING, Preformed	2	
-4	1631076-1	. . . ADAPTER, Thread	1	
-4A	1646811-3	. . . SEAL	1	
-4B	1653300-1	. . . TRAP, Water	1	
-5	1643231-1	. . . ELEMENT, Filter Tube	1	
	100-25DX	. . . ELEMENT, Filter Tube	1	
-6	1647709-1	. . . RETAINER, Helical	1	
-7	MS9068-012	. . . PACKING, Preformed	2	
-8	1647707-2	. . . RETAINER, Helical	1	
-9	1643196-2	. . . SPRING, Helical, Comp	1	
-10	1647711-1	. . . SLEEVE, Filter, Hsg	1	
-11	1647717-1	. . . BASE, Filter Mount	1	
-12	DELETED			
-13	DELETED			
-14	1643873-1	. . . TUBE, Fitting	1	
-15	1647723-1	. . . CUP, Support	1	
-16	1647708-2	. . . RETAINER, Helical	1	
-17	1647715-8	. . . BOLT, Special	1	

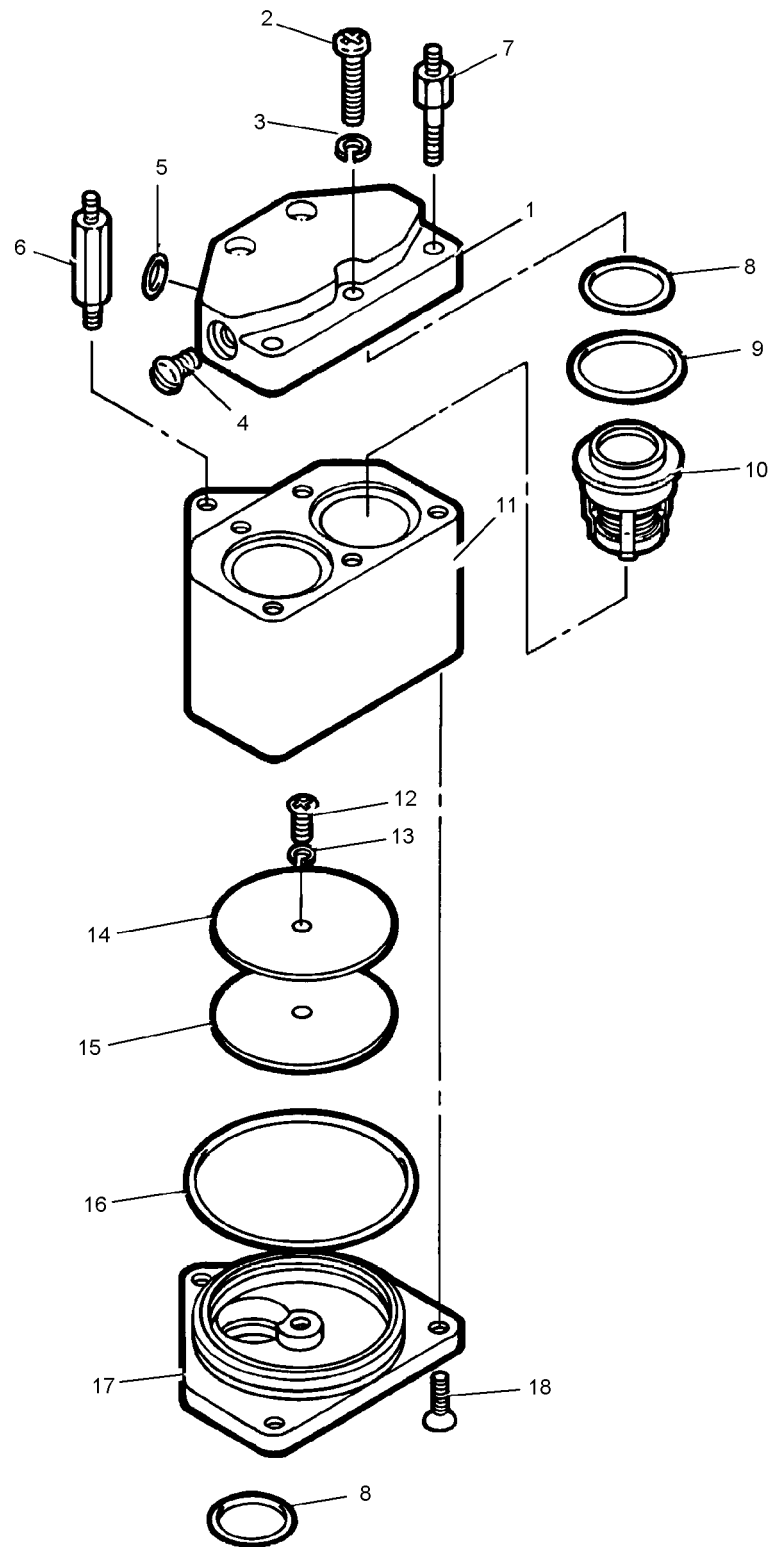


Figure 6-25. Plenum Assembly

006025

NAVAIR 13-1-6.4-3

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
6-25	3261077-0101	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-12/A)	REF	
	1647840-1	. CONCENTRATOR ASSEMBLY	REF	
	1647725-1	. . PLENUM ASSEMBLY	REF	
-1	1650173-1	. . . MANIFOLD (ATTACHING PARTS)	1	
-2	MS51957-17	. . . SCREW, Machine	3	
-3	MS35333-70	. . . WASHER, Lock ---*---	3	
-4	1618918-9	. . . SCREW, Machine	2	
-5	1602321-51	. . . PACKING, Preformed	2	
-6	1650102-1	. . . POST, Electrical-Mechanical	1	
-7	1647719-1	. . . BOLT, Special	2	
-8	1602321-5	. . . PACKING, Preformed	3	
-9	1602321-73	. . . PACKING, Preformed	2	
-10	1632137-3	. . . VALVE, Check	2	
-11	1647706-1	. . . PLENUM	1	
-12	MS51957-26	. . . SCREW, Machine	1	
-13	MS35333-71	. . . WASHER, Lock	1	
-14	1647716-1	. . . FILTERING DISK, Fluid	1	
-15	1631153-2	. . . FILTER ELEMENT, Fluid	1	
-16	MS9068-030	. . . PACKING, Preformed	1	
-17	1647714-1	. . . COVER, Plenum (ATTACHING PARTS)	1	
-18	MS51959-28	. . . SCREW, Machine ---*---	3	

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AN960C10L	6-18-8	PAGZZ	MS51957-30	6-18-3	PAGZZ
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AN960C416	6-18-19	PAGZZ	MS51957-63	6-18-5	PAGZZ
AN960C6	6-18-4	PAGZZ	MS51958-60	6-19-13	PAGZZ
CHEMFLUOR			MS51958-62	6-23-8	PAGZZ
AXH400002	6-22-10		MS51959-28	6-25-18	PAGZZ
M24236			MS51960-100	6-19-2	PAGZZ
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MS24665-374	6-18-33	PAGZZ	MS51960-83	6-18-2	PAGZZ
MS3367-1-9	6-23-25	PAGZZ	MS51960-84	6-19-4	PAGZZ
MS3367-5-9	6-18-23	PAGZZ	MS9068-012	6-24-7	PAGZZ
	6-23-20	PAGZZ	MS9068-016	6-20-29	PAGZZ
MS3367-7-9	6-23-26	PAGZZ		6-20-30	PAGZZ
MS35276-259	6-19-10	PAGZZ	MS9068-030	6-25-16	PAGZZ
MS35333-70	6-25-3	PAGZZ	MS9068-035	6-24-3	PAGZZ
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MS35338-135	6-20-3	PAGZZ	KK14	6-18-32	PAGZZ
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	6-20-10	PAGZZ	NAS1351C3-8	6-23-12	PAGZZ
	6-20-14	PAGZZ	NAS1352-04-5P	6-20-5	PAGZZ
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	6-20-21	PAGZZ		6-20-16	PAGZZ
	6-21-4	PAGZZ	NAS1352-04-6P	6-20-2	PAGZZ
	6-23-19	PAGZZ		6-20-13	PAGZZ
MS35338-136	6-20-24	PAGZZ		6-20-20	PAGZZ
	6-22-4	PAGZZ		6-20-23	PAGZZ
MS35338-138	6-19-8	PAGZZ	NAS1352-04-8P	6-21-3	PAGZZ
	6-20-39	PAGZZ	NAS1352-06-10P	6-22-3	PAGZZ
	6-23-9	PAGZZ	NAS1352C04-4	6-23-18	PAGZZ
	6-23-13	PAGZZ	NAS1352C04-6	6-23-22	PAGZZ
MS35338-154	6-20-3	PAGZZ	NAS1352C3-12	6-20-37	PAGZZ
	6-20-6	PAGZZ	NAS1352C3-8	6-20-38	PAGZZ
	6-20-10	PAGZZ	NAS1423C4	6-18-11	PAGZZ
	6-20-14	PAGZZ	NAS509-06C	6-18-15	PAGZZ
	6-20-17	PAGZZ	NAS620C10L	6-18-6	PAGZZ
	6-20-21	PAGZZ		6-18-10	PAGZZ
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	6-23-19	PAGZZ		6-19-14	PAGZZ
MS35338-155	6-20-24	PAGZZ		6-23-14	PAGZZ
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	6-23-9	PAGZZ		6-20-11	PAGZZ
	6-23-13	PAGZZ		6-20-15	PAGZZ
MS35489-147	6-23-24	PAGZZ		6-20-18	PAGZZ
MS35649-204	6-18-21	PAGZZ		6-20-22	PAGZZ
MS35842-12	6-20-33	PAGZZ		6-21-5	PAGZZ
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MS51100-5	6-18-16	PAGZZ			

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(1648106-1)	6-22-10	PAGZZ	1647721-2	6-18-20	PAGZZ
10-00-2085-1285	6-23-16	PAGZZ	1647723-1	6-24-15	XBGZZ
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1602321-5	6-20-27	PAGZZ	1647727-2	6-20-19	PAGZZ
	6-20-28	PAGZZ	1647730-1	6-19-15	PAGOG
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	6-21-7	PAGZZ	1647803-1	6-23-11	PAGZZ
	6-22-7	PAGZZ	1647836-1	6-20-1	PAGZZ
	6-23-4	PAGZZ	1647837-1	6-21-2	PAGZZ
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	6-24-2	PAGZZ	1647839-1	6-21-1	PAGZZ
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1602321-73	6-25-9	PAGZZ		6-23	
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1630838-1	6-21-10	PAGZZ	1647848-1	6-20-12	PAGZZ
1630839-1	6-21-9	PAGZZ	1647849-1	6-20-31	PAGDD
1630850-7	6-23-2	XAGDD	1647850-1	6-22-6	PAGZZ
1630850-8	6-23-1	XAGDD	1647852-1	6-18-1	MGGZZ
1631049-1	6-22-9	PAGZZ	1647877-1	6-18-13	PAGZZ
1631076-1	6-24-4	XBGZZ	1647878-1	6-18-22	MGGZZ
1631085-1	6-23-7	XBGZZ	1647906-1	6-18-34	PAGOG
1631153-2	6-25-15	PAGZZ	1647907-1	6-18-36	PAGOG
1631266-1	6-18-38	XBOZZ	1648123-1	6-19-12	MGGZZ
	6-19-17	XBOZZ	1648353-2	6-22-11	XBGZZ
1631267-1	6-18-35	XBOZZ	1648573-1	6-18-17	MGGZZ
	6-18-37	XBGZZ	1648576-1	6-23-21	XBGZZ
	6-19-16	XBGZZ	1649306-1	6-23-10	XBGZZ
1632137-3	6-25-10	PAGZZ	1649318-1	6-22-2	MGGZZ
1643196-2	6-24-9	PAGZZ	1649332-1	6-20-32	XBGZZ
1643231-1	6-24-5	PAGZZ	1649333-1	6-20-35	PAGZZ
1643873-1	6-24-14	PAGZZ	1649957-1	6-18-31	MGGZZ
1646811-3	6-24-4A		1650100-1	6-19-5	MGGZZ
1647701-1	6-20-36	PAGZZ	1650102-1	6-25-6	PAGZZ
1647706-1	6-25-11	XBGZZ	1650103-1	6-18-25	MGGZZ
1647707-2	6-24-8	PAGZZ	1650103-2	6-18-26	MGGZZ
1647708-2	6-24-16	PAGZZ	1650103-3	6-18-27	MGGZZ
1647709-1	6-24-6	PAGZZ	1650103-4	6-18-28	MGGZZ
1647711-1	6-24-10	XBGZZ	1650103-5	6-18-29	MGGZZ
1647712-1	6-24-1	XBGZZ	1650103-6	6-18-30	MGGZZ
1647714-1	6-25-17	XBGZZ			

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1653300-1	6-24-4B	PAGZZ
1653997-1	6-22-8	PAGGG
	6-24	
1657420-1	6-20-31	PAGDD
1657867-1	6-20-8	PAGZZ

Part Number	Figure and Index No.	SM&R Code
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	6-20	PAOGG
	6-21	PAOGG
	6-22	PAOGG
	6-23	PAOGG
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	6-25	PAOGG

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